University of Alberta

The Role of Skill-Based Habits of Use in Consumer Choice

by

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To Colleen.

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CHAPTER 1: INTRODUCTION

There are many arts among men, the knowledge of which is acquired bit by bit by experience. For it is experience that causeth our life to move forward by the skill we acquire, while want of experience subjects us to the effects of chance.
Plato

The ability to learn from experience is of central importance to human existence. It allows us to acquire the skills we need to complete a wide variety of tasks. After a while, we are able to improve our performance at those tasks, reducing the time and effort required, to the point where they become routine. Learning to drive is a familiar example. For a beginner, driving can be an overwhelming experience. Steering with your hands, adjusting your speed with your feet, shifting gears at the appropriate time, obeying traffic laws, avoiding obstacles, reacting to other drivers, listening to the radio, navigating towards your destination and numerous other tasks have to be completed simultaneously and often under time pressure. Initially each of the requisite skills is immature or nonexistent, which makes learning to drive a challenge. Nevertheless, with practice most of us find driving to be a routine, even simple, task. The truth is that our everyday lives are filled with tasks that, although initially very difficult, we soon learn to complete without a second thought. If these routine tasks did not become automatic we would struggle to complete even a fraction of what we do in a day.

Habitual behaviour is a rational adaptation to a world with ever-increasing demands on our time and energy. Habits are a good way to make decisions and complete routine tasks in a time-starved world. Whether we are driving to work or choosing a grocery store, it is often most efficient to simply do what we did last time to successfully

complete the same task. With practice, a number of the requisite activities become automatic and can be accomplished with little conscious thought or awareness (James, 1890). For example, an experienced typist is able to automatically recognize words and execute the appropriate keystrokes without having to consciously control the individual cognitive and physical processes (Salthouse 1986). As the typist becomes more skilled, and more of the underlying processes become automatic, the time required to type a page decreases. In the context of consumer behaviour, consider the grocery shopper looking to buy a carton of orange juice. With practice, driving to the store, navigating the aisles, selecting the right size and paying at the appropriate checkout all become automated and can be accomplished with little conscious thought. When the same set of automated activities reliably leads to the successful achievement of a goal, the behaviour can be described as habitual (Aarts and Dijksterhuis 2000a). Habits are a type of goal-directed automatic behaviour (Bargh 1990): they are knowledge structures that include a goal and the actions required to achieve that goal (Aarts and Dijksterhuis 2000a). The more often the goal is associated with successful actions, the stronger the habit and the more quickly the goal can be achieved. In other words, we can define habits as repeated behaviour that results in the increasingly rapid accomplishment of a particular goal, as compared to novel behaviour aimed at accomplishing the same goal.

As a result, to continue with our grocery shopping example, habitually buying orange juice at the familiar store can be accomplished more efficiently and with less effort than at unfamiliar competing grocery stores. The *principle of least effort* (Zipf 1949) has long recognized that people attempt to achieve the results they desire with a minimum amount of effort. Having repeatedly practiced completing a task, such as

buying orange juice, the consumer acquires skills and knowledge that allow him/her to complete the task with a minimum amount of effort by doing it the same way as last time. In this way, the development of consumption habits creates a cost of switching from an incumbent brand, for which specific skills have been acquired, to a competing brand. When the cost of switching is high enough, the consumer can become *locked-in* to the incumbent brand, unable to switch to competitors without paying a price in terms of new skill acquisition (Ratchford 2001; Shaprio and Varian 1999; Wernerfelt 1985).

It is important to recognize that I am talking about **habits of use, not habitual choice.** The distinction may be a subtle one. Habits of use create switching costs that lead to a preference for an incumbent; habitual choice is about consistently choosing the same product. Habitual choice, as it has been used in the marketing literature (e.g., Ehrenberg 1988; Aaker 1991), is a label for repeatedly making the same choice. Habits of use may result in habitual choice, but habitual choice may be the result of many other factors as well (Chestnut and Jacoby 1978).

Habits of use can lead to lock-in (Johnson, Bellman, and Lohse 2000), a form of loyalty that differs significantly from traditional notions of brand loyalty because it does not require a positive attitude towards the product, trust in the product or the objectively superior functionality of the product. Instead, lock-in as a result of brand-specific training depends only upon the relative cost, in terms of time and effort, of using a competitor. The difference is critical, because it sets limits on where and when habits of use may be affecting consumer choice. For instance, habits of use may affect which grocery store a shopper buys Coca-Cola at because the shopper has become skilled at navigating the aisles and making the purchase. However, habits of use cannot explain

why a shopper chooses to purchase Coke rather than Pepsi, because the skills required to consume the two products are identical (e.g., opening the can, drinking from the can, etc.). Nevertheless, a shopper may *habitually choose* a can of Coke over a can of Pepsi. To put it another way, habitual use is an *explanation* of an important type of consumer loyalty; habitual choice is a label that *describes* a type of consumer loyalty.

This dissertation is an in-depth investigation of the development of habitual usage behaviour as a result of repeated practice with an incumbent web site interface. I argue that repeated exposure to a specific interface results in the acquisition of skill and the development of habit that in turn reduces the time required to use that interface to accomplish consumption goals, relative to competitors. This reduction in the time required has an economic value – that can be conceptualized as a type of *human capital*[1] (Ratchford 2001) – to the extent that the consumer values his/her time. As human capital becomes associated with one specific interface, consumers become loyal to that interface because switching to a competitor would cost the consumer time in acquiring new competitor-specific skills. With practice consumers become loyal to the incumbent interface even though, given the same experience with other interfaces, these would be equally useful. Moreover, I predict that human capital can accrue to the point where consumers will chose the incumbent over a competitor that was considered superior prior to experience with either interface. This research is a first step towards examining the impact of skill-based habits on consumer choice, and it is the first time that the consumer behavior predictions of the human capital model have been tested in a controlled setting. In addition, this line of research adds to the literature on consumer behaviour in

[1] Human capital is defined as the skill and/or knowledge acquired through training and/or learning by doing. For more detail see *Human Capital and the Household Production Model* below.

electronic environments, and more generally human-computer interaction, by explicitly testing the effect of habitual behaviour on interface choice and the impact of a number of key moderating factors.

The remainder of the dissertation is organized as follows. This chapter continues to develop the theoretical background for the experiments. The next section of this chapter explains why consumption on the internet is a practical, relevant and interesting applied setting in which to investigate habits of use. This is followed by a brief review of the power law of practice and its importance in understanding the value of repeatedly practicing a task and acquiring skill. I then examine the adaptive value of automating task performance and the important impact of time pressure on consumer decision making in modern society. Having demonstrated the psychological value of automating behaviour in the time-starved world of internet consumption, I turn to a review of economic models that formally link the acquisition of skill to the development of consumer preference. The literature review concludes with a brief examination of research on consumer loyalty and the distinct nature of loyal behaviour that is driven by habit. The research hypotheses, as well as the experimental design, methods, procedures, results and discussion are covered in Chapters 2 and 3. Specifically, Chapter 2 presents evidence in favour of the fundamental prediction that repeated practice results in the development of habit, which in turn leads to a preference for the incumbent (Experiment 1) and a reluctance to try (search for) alternatives (Experiment 2). In addition, Chapter 2 argues that these habits are *goal-activated* automated behaviors, directly testing the impact that the consumer's operational goal state has on decision making (Experiments 2 and 3). Chapter 3 extends the findings of Chapter 2 by testing the impact of three key

moderating variables: the complexity of the consumption task (Experiment 4), the constraints within the learning environment (Experiment 5), and the consumer's time value (Experiment 5). Furthermore, the results of Experiment 5 demonstrate that in competitive environments, once a consumption habit has been developed, consumers may choose an incumbent interface over a competitor that was considered superior prior to experience with either interface. The experimental designs for all five experiments are summarized in Table 1.

Table 1: Overview of Experiments

	Experiment One	Experiment Two	Experiment Three
Between Subjects Design	2 (path similarity) x 9 (incumbent trials)	2 (goal-activation) x 2 (incumbent trials)	2 (goal-activation) x 2 (incumbent trials)
Number of Incumbent Trials	From 1 to 9	1 vs. 9	1 vs. 9
Time pressure	No	No	No
Learning Environment	Constrained	Constrained	Constrained
Navigation Path Similarity	Same vs. Changing	Same	Same
Goal-activation	Same	Same vs. Different	Same vs.Different
Interface Complexity	High	High	High
Experience with competitor required	Yes	No	Yes
Objective Functionality of competitor	Equivalent	Equivalent	Equivalent

	Experiment Four	Experiment Five
Between Subjects Design	2 (complexity) x 2 (incumbent trials)	2 (time pressure) x 2 (learning environment)
Number of Incumbent Trials	1 vs. 9	9
Time pressure	No	No vs. Yes
Learning Environment	Constrained	Constrained and Free
Navigation Path Similarity	Same	Same
Goal-activation	Same	Same
Interface Complexity	High vs.Low	Low
Experience with competitor required	Yes	Yes
Objective Functionality of competitor	Equivalent	Superior

Consumer Behaviour in Electronic Environments

A web site interface was chosen as the experimental environment/stimuli for both its external and internal validity. Consumer behaviour on the World Wide Web provides an interesting opportunity to study habitual consumption, in part because a great deal of the activity being conducted online lends itself to habitual behaviour. For example, retrieving stock quotes, scanning news headlines, researching product information or checking bids at an online auction can all quickly become routine. In fact, the ability to quickly complete such tasks is one of the primary advantages of the internet. It is not surprising then that a large portion of internet users can be described as *simplifiers* – i.e. users whose primary goal is to simplify their lives and save themselves time. *Simplifiers* account for 29% of internet consumers and over 50% of all online transactions (Forsyth, Lavoie and McGuire 2000). In addition, it seems that the number one predictor of buying behaviour online is the amount of discretionary time internet users have. Bellman, Lohse and Johnson (1999) surveyed 10,180 internet users on a number of issues related to web-based activity. With regards to internet shopping they concluded "that Web consumers shop online or use online services to save time" and that "convenience rather than cost savings, may be a key benefit offered by successful online stores" (p. 38). This fact has not been lost on the leading dot-com companies. The battle between Barnes & Noble and Amazon over Amazon's one-click technology is an excellent example of the importance being placed on the ability to simplify consumers' lives in a proprietary manner.

Being able to provide convenient access to products and services over the internet appears to be worth the fight as the evidence indicates that consumers are loyal to web sites that they have learned to use effectively and efficiently. Johnson, Moe, Fader,

Bellman and Lohse (2003) examined data from a panel of approximately 10,000 households during a 12-month period from July 1997 to June 1998 to see how many unique sites were searched by each household for product categories such as books and CDs. Their findings indicate that the average number of online stores searched before a CD is purchased is 1.1, and that 70% of CD shoppers and 70% of book shoppers are loyal to a single site. They conclude that their findings are not the result of a loyal segment of consumers, but rather that all consumers are unlikely to "shop around" before making a purchase online. In a related study, the authors demonstrate that the duration of site visits decreases the more a site is visited and that this decrease adheres to the same power law of practice that describes learning in a variety of other domains (Johnson, Bellman and Lohse 2003). The authors argue their findings suggest that consumers are returning to the sites that they have learned to use. Preliminary tests of this explanation have also been carried out in a laboratory setting (Murray and Häubl 2002), and the results support Johnson et al's (2003) theory that the acquisition of site-specific skills can create loyal consumers. It is worth noting that these loyal online consumers are on average buying from the higher priced retailers even for homogeneous products such as CDs and books (Smith and Brynjolfsson 2001).

What is of particular interest in this early research is the finding that increasing web site loyalty is closely related to decreasing amounts of time being spent at the web site. The initial evidence seems to suggest that skill acquisition may explain this type of loyalty (Murray and Häubl 2002). Johnson et al. (2003, p. 62) describe it this way:

> Imagine a user visiting a Web site to purchase a compact disc (CD). This user must first learn how to use the Web site to accomplish this goal. We believe that after the CD has been purchased, having learned to use this site raises its attractiveness relative to competing

> sites for the consumer, and all other things being equal (e.g. fulfillment), the site will be more likely to be used in the future than a competitor. Further use reinforces this difference because practice makes the first site more efficient to use and increases the difference in effort between using any other site and simply returning to the first site, where browsing and buying can be executed at the fastest rate. This reinforcement generates an increasing advantage for the initial site.

As a result, and contrary to popular opinion, it would appear that online shopping is not living up to its billing as a frictionless marketplace. Although the potential to reduce costs related to information search and product comparison clearly exists in electronic markets (Häubl and Trifts, 2000), recent research suggests that online consumers are engaging in only limited search and comparison shopping.

These observations have not been lost on those seeking to build companies on the web. Since the early days of e-commerce, an argument has been made for the importance of developing a user base at the expense of short-term profitability (Rayport and Jaworski 2001). According to Shapiro and Varian (1999), one of the primary advantages of building an installed user base in the information age is the ubiquity of switching costs. They contend that once a buyer has committed to using a particular brand they become predisposed to that brand and are much less likely to search for alternatives or switch to competitors. The importance of developing an installed base of users is evident in the fundamental role played by the "growth over profit" approach in the early business models of many of the web's leading companies from Yahoo to iVillage and from Amazon to WebMD. Jeff Bezos, founder and CEO of Amazon.com explains the company's initial commitment to growth over profit this way: "Our initial strategy was very focused and very unidimensional. It was GBF: Get Big Fast. We put that on our

shirts at the company picnic: They said Get Big Fast, and on the back, Eat Another Hot Dog" (Brooker 2000).

Closely related to the growth imperative is the desire to be a first-mover. Barnes and Noble has not been able to catch up to Amazon's market share in book selling nor have they been able to successfully switch a significant portion of Amazon's customers over to their web site. This is true even though they had a 122 year head start in the book selling business and a formidable advantage in terms of offline resources, including a better selection of titles and competitive prices. Other late movers in the book-selling business such as Borders were forced to abandon their online ambitions in the face of an installed and loyal Amazon customer base. Borders Group president and chief executive officer, Greg Josefowicz, argued that selling their struggling online operations to Amazon is necessary if Borders is to "offer our customers the convenience of an online shopping option with the added benefits that will emerge through our new association with Amazon.com, the world's recognized e-commerce leader" (Hansell and Kirkpatrick 2001).

However, the theory of psychological reactance (Brehm & Brehm 1981) suggests that there may be a down side to being a first mover and acquiring a dominant market share. Specifically, consumers who feel that they have had their freedom of choice restricted may react negatively towards the source of that restriction (Fitzsimmons 2000; Godek and Yates 2003). The lack of alternative courses of action, or decisional control (Averill 1973), experienced by consumers in monopolistic markets may result in a reduction in preference for the choice available. In other words, when consumers are forced to buy from a particular vendor, their loyalty to that vendor may be negatively

affected. Consider for example Microsoft and the Windows operating system. As the dominant player in PC operating systems, Microsoft has sparked substantial negative reaction to its products and even loyal consumers (as measured by repeat purchases) have expressed dissatisfaction and dislike for its products. Microsoft has even gone so far as to invest in its rivals (such as Apple computer) to ensure that users have choice (and to appease anti-trust regulators). The point here is that in contrast to the advantages of "getting big fast" and being a first mover, reactance theory suggests that stronger loyalty is likely to develop when the consumer feels that they have a choice among products.

All in all, shopping on the internet appears to be an interesting real-world example of consumer decision making being influenced by the decreasing task completion times that result when repeated experience leads to habitual use. Accordingly, it is an attractive realm of consumer behaviour within which to study the link between task learning and consumer preference development. In addition, the growing role of consumption on the internet provides the opportunity to study repeated consumer choice behaviour in an environment that parallels a real-world experience, while preserving the ability to control key factors within that environment.

Switching Costs and Lock-In on the Internet

The spectre of the internet as a frictionless marketplace grew from the belief that in an electronic environment switching costs are almost non-existent and the competition is always only a "click away". This follows from classical economic theory, which argues that lower search and evaluation costs lead to a state of hyper-competition and rock bottom prices (Bakos 1997). The idea is that a consumer looking to buy a particular book can easily search through a number of online bookstores and buy from the one with

the lowest price. To be even more efficient, the same consumer can use a *shopbot* or electronic recommendation agent to find the retailer with the lowest price on their behalf (Smith and Brynjolfsson 2001). Especially in the case of homogenous products such as books and CDs, the majority of consumers would consistently buy from the lowest priced retailer. However, as previously mentioned, this theory has not been supported by the empirical evidence. In fact, consumers appear to be conducting very little search before making a purchase (Johnson, Moe, Fader, Bellman and Lohse 2003). Switching costs seem to be greater and consumers seem more prone to becoming locked-in than many pundits originally expected.

Lock-in occurs when buyers fail to search out alternatives or comparison shop as a result of substantial switching costs. Both lock-in and high switching costs have played a prominent role in the rise of the information economy (Shapiro and Varian 1999). For example, Bell Atlantic became locked-in when it invested $3 billion in digital switches, to run its telephone network, developed by the proprietary technology of AT&T. From that point on they were dependent on AT&T whenever they wanted to add to or expand their network, and as a result Bell Atlantic became locked-in to buying switches from AT&T. Another example of lock-in occurred when millions of users signed up for Microsoft's Hotmail email accounts. Once Hotmail users had given out their email addresses to colleagues, friends and family, they faced a switching cost if they moved to another email provider (i.e., they would have to update all of their contacts with a new address).

However, in most cases the online shopper does not face the type of switching costs that have locked-in Bell Atlantic or Hotmail users. The internet consumer is not

limited by contractual commitments, or proprietary technology, or even high search costs. Nevertheless, it appears that they may become locked-in as a result of brand-specific training. Once they have learned to use a particular interface to the point where tasks that were once time consuming become routine, a cost of switching does arise (Murray and Häubl 2002).

The Power Law of Practice

As we have already discussed, current evidence indicates that web site loyalty is closely tied to decreasing time being spent at a site, which can be closely approximated by the power law of practice (Johnson et al 2003). With repeated exposure to a web site, the consumer has the opportunity to practice using the interface. As the number of exposures increases, shoppers spend less time at the site and are able to complete tasks more rapidly (Murray and Häubl 2002). Given that most online buying is done by shoppers looking to simplify their lives and the best predictor of online buying is "time starvation" (Bellman et al. 1999), the potential exists for lock-in to occur as the consumer learns about, or acquires skill related to, a particular site. Not surprisingly, this type of learning appears to be subject to the same type of learning curve as the vast majority of cognitive and motor skills (for a review, see Newell and Rosenbloom 1981): the observed reductions in task-completion time follow a pattern that is very closely approximated by a power function (Johnson et al. 2003). It appears that "time starved" internet consumers are becoming increasingly loyal as they learn more and more about a particular site, and as a result become faster and faster at using the site.

It is commonly recognized that, in general, practice at a task results in improved performance, and that more practice leads to even more improvement, but at a decreasing

rate. In other words, the biggest gains in performance are made early on, and although performance continues to improve, the rate of improvement declines. This pattern of learning, which adheres to the power law of practice, is often referred to as a learning curve. It is so ubiquitous in studies of skill acquisition that "current theories of skill acquisition and automaticity treat the power law as a benchmark prediction that they must make in order to be taken seriously" (Logan 1992, p. 883). According to the power law,

$$T = a + bN^{-c},$$

where T is the time required to complete the task, a is the asymptote (the limit on performance), b is the difference between the initial and the asymptotic performance, N is the number of exposures to the task (i.e., the amount of practice), and the exponent c is the learning rate.

The value of practice is captured by changes in the term T, the time required to complete the task. As the number of exposures to the task increases the time required to complete the task decreases as a power function. For example, the more practice a driver has at parallel parking the more quickly s/he is able to parallel park; however, while practice increases the speed of performance, the biggest gains are made early on and the magnitude of the increase in performance diminishes with additional practice. Similarly, the more times a shopper buys a book from Amazon.com, the more rapidly s/he is able to buy a book at Amazon – although, again, the rate of improvement decreases over time.

Modern Automaticity

Researchers studying judgement and decision making have become increasingly dissatisfied with models that view human behaviour solely as a product of conscious

choice (Lowenstein 2002). An alternative perspective argues that many decisions are made automatically and with little conscious forethought or deliberation (Zaltman 2000). However, while a great deal of decision making research has focused on issues such as the effort-accuracy trade-off (Payne, Bettman and Johnson 1990) and the role of consumer involvement (Petty, Cacciopo and Schumann 1983), very little attention has been given to the role of automatic and habitual behaviour in a consumption context. Yet, the reality of human mental activity is that most of what we do takes place unconsciously (Bargh 1990; Lynch and Srull 1982). Along these lines, and following E. J. Langer (1978), Bargh and Chartrand (1999) argue against the predominant view in psychology that most of human decision making is based on conscious or systematic processing of incoming information. Instead, they contend that the evidence indicates that "the ability to exercise such conscious, intentional control is actually quite limited, so that most of moment-to-moment psychological life must occur through nonconscious means if it is to occur at all (p. 462)."

Our ability to relegate the majority of what we do to an unconscious level is an essential component of human functionality. This capability is a part of the adaptive nature of human cognition that has allowed us to successfully master a wide variety of tasks and to thrive in a large range of environments (Anderson 1990). We do not have to consciously control basic functions such as breathing and we are able to automate more complex tasks such as typing or shifting gears while driving, to the point where they become effortless. We are able to automate these initially complex tasks because with practice we can minimize the cognitive resources, and the amount of time, required to complete them.

The increasing demands that modern society has placed on our time, in combination with our ability to automate tasks over time, has resulted in a sort of *modern automaticity*. Cialdini (2001, p. 238) explains it this way:

> Because technology can evolve much faster than we can, our natural capacity to process information is likely to be increasingly inadequate to handle the abundance of change, choice, and the challenge that is characteristic of modern life. More and more frequently, we will find ourselves in the position of lower animals – with a mental apparatus that is unequipped to deal thoroughly with the intricacy and richness of the outside environment. Unlike the lower animals, whose cognitive powers have always been relatively deficient, we have created our own deficiency by constructing a radically more complex world. The consequence of our new deficiency is the same as that of the animals' long-standing one: when making a decision, we will less frequently engage in a fully considered analysis of the total situation.

Cialdini's claim that modern society has increased the demands on our time and resources to the extent that we are unable to "engage in a fully considered analysis" echoes Stigler and Becker's (1977) contention that "the costs of searching for information and of applying the information to a new situation are such that habit is often a more efficient way to deal with moderate or temporary changes in the environment than would be a full, apparently utility-maximizing decision" (p. 82). Stigler and Becker take the argument a step further and propose that such habits develop because the consumer has invested time and effort in learning about the choice environment and developing skills specific to that environment.

As Simon (1955) argued many years earlier, humans are *satisficers* rather than maximizers. In other words, we are willing to pay a higher price for a book when the value of doing so, in terms of time and effort, is justified. As we have seen, it appears that with repeated practice at one site, consumers on the internet are willing to pay a

higher price for the convenience and time savings of not having to shop around. Along these lines, recent research on habitual behaviour suggests that habits are indeed a form of goal-directed behaviour. In other words, goals such as buying a book are capable of activating habitual action such as navigating to Amazon.

Henk Aarts and colleagues have extensively investigated the role of habit in travel mode choice behaviour (Aarts and Dijksterhuis 2000a; Aarts and Dijksterhuis 2000b; Aarts, Verplanken and Van Knippenberg 1994; Aarts, Verplanken and Van Knippenberg 1998). They have found that habitual behaviour can be elicited simply by activating a goal. In their view, habits can be seen as hierarchical knowledge structures with goals at the top of the hierarchy and relevant behaviours at the bottom. In situations where habitual behaviour has become established, the goal automatically activates the associated behaviours. For example, in their studies of travel mode choice they have found that students who routinely ride their bikes to school respond much faster to the bike travel mode in the presence of a travel goal, than those who do not routinely ride their bikes to school (Aarts and Dijksterhuis 2000b). However, students who routinely ride their bikes to school do not respond faster to the bike travel mode when a travel goal is not present (as compared to those who do not routinely ride their bikes to school).

In Aarts' research, as well as in the research of Stigler and Becker (1977) and Cialdini (2001), habits are defined by their ability to reduce the time required to make a decision and complete the relevant required actions. The value of habitual behaviour lies in the fact that it reduces the amount of time required to accomplish an activated goal, whether that goal is choosing a mode of travel (Aarts and Dijksterhuis 2000a), choosing keystrokes when typing (Salthouse 1986), or choosing among a set of products (Cialdini

2001; Stigler and Becker 1977). In all cases, the key antecedent of habit development is the frequency with which one engages in a particular set of actions in the presence of a particular goal. In other words, the repeated co-occurrence of a goal with an action increases the ease with which the action can be elicited in the presence of the goal and the ease with which the action can be completed. Consumption on the internet is filled with examples of such repeated goal-directed behaviours. For example, buying a book leads the shopper to return to Amazon, looking up a stock quote leads back to Yahoo, or browsing today's news headlines leads to CNN.com.

Understanding Habit beyond Operant Conditioning

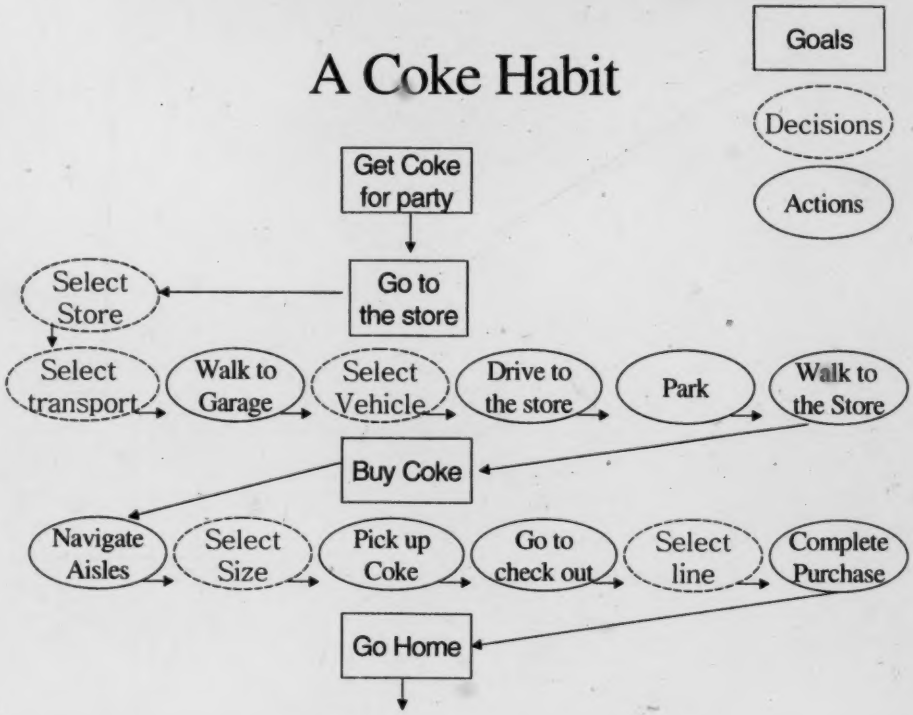
Historically, the concept of habit has been strongly rooted in behaviourist approaches to learning theory (Watson 1913). A key assumption of the behaviourist tradition is that cognitive processes do not play a role in the activation of habitual responses. Contemporary research, however, has challenged this assumption and demonstrated that cognition does play a role in what was previously described as reflexive operant behaviour (Norman and Shallice 1986; Ronis, Yates and Kirscht 1989). The current perspective is that habitual behavior is a continuum from basic reflexive actions (e.g., Watson 1913) to more complex knowledge structures (Aarts and Dijksterhuis 2000a). In all cases, frequent and consistent choices made to successfully achieve the same goal create a habit – i.e., an association between that stimulus (goal) and an action (or set of actions). For instance, a consumer who regularly checks the latest news headlines at CNN.com creates an association between the desire for up-to-date information and the actions required to navigate to CNN.com to find the relevant stories.

As this association becomes stronger the navigation actions become automatically activated in the presence of the consumption goal, and as a result a habit of use is created.

The key difference between the knowledge-structure conceptualization of habit and the basic stimulus-response models of classical and operant conditioning is the complexity of the behaviour that is attached to the goal (stimulus). In addition, habits of use that are the focus of this dissertation develop through skill acquisition, and therefore, can not explain preference differences between products for which skills are entirely transferable. For example, the skill required to drink a can of Coca-cola is entirely transferable to Pepsi, and so a preference for a can of Coke over a can of Pepsi is not explainable in terms of skill-based habits. However, it might be explainable in terms of operant or classical conditioning, wherein the goal is to quench one's thirst and the conditioned action is to select and drink from a red and white (Coke) can. On the other hand, when no cola is nearby and the goal is to drink a Coke, this may activate the more complex set of actions required to transport oneself to the store, navigate the isles and make a purchase. When these behaviours are automatically activated in the presence of a specific goal ("quench thirst") and the actions have been routinized, a more complex type of habit – a knowledge structure of goal-activated and automated behaviours (Aarts and Dijksterhuis 2000a) – may develop. An example of this type of knowledge structure is illustrated in Figure 1.

Figure 1: An Example of a Habit Knowledge Structure

Habitually Buying Coca-Cola at the Local Grocery Store



The Relationship between Skill Acquisition and Preference Formation

At this point, it should be clear that the ability to reduce task performance time through practice is a central element of human learning and development. In addition, it is apparent that consumers on the internet face high time costs and are motivated by their need for time savings through rapid consumption experiences. In combination, this has the potential to lead to habitual behaviour that is triggered by specific goals. However, skill acquisition and skill automation alone are not sufficient to explain loyalty that results from the accumulation of brand-specific human capital. The key link between skill acquisition and loyal behaviour is the activation of those acquired and automated skills in the presence of a goal. This has important consequences for consumer

behaviour. Learning to navigate a grocery store to buy orange juice does not necessarily lock consumers in to the same store when the goal is to purchase a birthday cake. Similarly, learning to use Amazon to buy a book does not mean that the consumer will automatically go to Amazon when the goal is to buy a CD. Along the same lines looking up stock quotes at Yahoo does not mean that the user will inevitably sign up for a Yahoo email account. The conceptualization of habits of use as goal-directed automated behaviour connects the acquisition of skill to the development of lock-in, by making explicit the important role played by goal-activation, in addition to the time savings inherent in routinized behaviour.

In some cases the behaviour that is activated in the presence of a specific goal may be automated to the point where it becomes unconscious, autonomous, and effortless (Shiffrin and Schneider 1977). However, in a consumption context it is more likely to take the form of a "shortcut" to task completion that substantially reduces the amount of conscious pre-decision analysis undertaken (Cialdini 2001), and relies on successful prior behaviour to direct current and future behaviour (Stigler and Becker 1977). Such habits have an economic value to the consumer to the extent that the consumer values his or her time (Ratchford 2001).

Human Capital and the Household Production Model

The idea that consumers can affect the value of a brand, product or service as a result of experience or skill acquisition has been formalized in the economic theories of human capital (Ratchford 2001, Wernerfelt 1985). According to Ratchford (2001, p. 397): "Human capital is basically knowledge, skill, or expertise embodied in people and acquired through investments in formal or informal education, training, or learning by

doing." While the notion of human capital has traditionally been applied to returns on investment in schooling and training, and the relationship between investments in human capital and economic growth (e.g., Becker 1993, 1996), it is also emerging as an explanation of human behaviour at a micro level. The central tenet is that humans will direct their consumption behaviour towards those brands, products and services that they have learned to use. Specifically, the human capital model of consumer behaviour postulates that, as a result of different consumption experiences over time, people develop preferences for specific items. Moreover, the accumulation of human capital that is particular to a specific item reduces the total cost of that item, a cost that includes time and effort in addition to the sticker price. This is an important point because it ties the power law of practice to consumer preference formation. In essence, the human capital model suggests that the savings, in terms of time, that are realized as a result of practice have an economic value in that the total cost of performing tasks or consuming items in the future is reduced. The reduction in future costs as a result of acquired skill means that things in which people have invested human capital (i.e., for which they have accumulated relevant knowledge and skill) will cost less and, therefore, be preferred to things in which no investment has been made. Consequently, people who are forward looking should seek to make investments in human capital today that reduce the costs of future use or consumption (Erdem and Keane 1996).

This approach to the study of human choice behaviour differs from traditional models of choice in that it explicitly considers time costs and the value of specific knowledge or skill. It predicts that people with high time costs will be more affected by their investments in human capital than people with low time costs. In other words,

investments in human capital will have a greater impact on the preferences of individuals that place a higher value on their time. The human capital model also predicts that the accumulation of knowledge and/or skill specific to a particular item leads to an increase in preference for that particular item. As a result, the model makes an important connection between consumer preference formation and the acquisition of knowledge and/or skill.

User Skills and Brand Loyalty

Wernerfelt (1985) argued that experience can result in the acquisition of skills that make a particular item more useful than some other item, even though, given the same amount of experience with the other item, the latter would be equally useful. Applied to a computer interface, such as an electronic storefront, this suggests that users will come to prefer those stores for which they accumulate applicable knowledge and skill. For example, having used Amazon.com over time and having developed skills that reduce the effort/cost required to make a purchase at this vendor's digital store, a shopper may prefer Amazon.com over its competition even though a competitor's site may have been preferred had the person initially developed skill in using it.

The basic idea here is that practice reduces the time required to complete a particular task, such as shopping at an electronic store. As a result, the total cost (including the time cost) of, to continue with the above example, buying a book at Amazon.com is lower than the total cost of buying the same book at Barnes & Noble's site because of the human capital that has been invested at Amazon.com.

One of the key factors in the development of brand loyalty as a result of user skill acquisition is the transferability of those acquired skills. Some of the skills acquired in connection with one interface can, in fact, be transferred to other interfaces – i.e., some skills are transferable. For example, learning to use SAS's statistical software teaches the user about SAS's software, but it also teaches the user something about statistics programs in general. Therefore, learning about SAS results in the development of skills that are transferable to other statistics programs such as SPSS. Nevertheless, learning to use SAS may also result in the development of non-transferable user skills that increase the consumer's preference for SAS relative to SPSS. I believe it is important to recognize that both types of skills, transferable and non-transferable, can have a significant impact on consumer choice. While non-transferable skills may decrease the cost of using one product or interface relative to a competitor, transferable skills reduce the cost of using all products (or interfaces) within a particular category. Therefore, only the development of a user segment with non-transferable skills represents a competitive advantage for a particular product.

Skill Transferability and the Development of Preference

Evidence from empirical research indicates that, when competing interfaces are very similar, users will acquire skills that are easily transferable from one interface to the other (Murray and Häubl 2002). As a result, they will be more likely to switch from the interface with which they have prior experience (the "incumbent interface") to an alternative (the "competitor interface"). In fact, when two interfaces are highly similar, the incumbent interface may well be at a disadvantage if users who are exposed to a highly similar competitor interface are attracted by the latter's novelty (Zeaman 1976).

This possibility has been demonstrated in recent research, which establishes that when interface similarity is high, users tend to prefer the (more novel) competitor interface (Murray and Häubl 2002).

However, in an environment where a greater proportion of non-transferable skills are developed – i.e., when the competitor interface is noticeably different from the incumbent – users tend to prefer the incumbent interface and are much less likely to switch to the competitor interface[2] (Murray and Häubl 2002). Therefore, it is important to note that, while experience results in the acquisition of both transferable and non-transferable user skills, only non-transferable skills result in a greater relative preference for the incumbent interface, which increases as the amount of experience with the incumbent increases. As a result, the research proposed herein focuses on the acquisition and automation of non-transferable skills.

Habits of Use and Consumer Loyalty

The literature on consumer loyalty is split into two general approaches. The *attitudinal approach* focuses on the cognitive processes that are involved in the evaluation of a particular brand, product or service (Lutz 1981, Oliver 1999), while the *behavioural approach* infers brand loyalty from actual purchase behaviour (Chestnut and Jacoby 1978). The notion of buyer lock-in is much more closely related to the behavioural approach. The traditional attitudinal view of loyalty as a positive, long-term, emotionally engaged, and voluntarily entered relationship is distinctly different than the type of repeated purchase behaviour exhibited, for example, by Bell Atlantic towards AT

[2] It is worth noting that the two interfaces differed only in their use of color, the type of response field (pull-down menus versus radio buttons), and placement of product attributes (see Murray and Häubl 2002 for details).

& T. While lock-in does not preclude positive affect or voluntary entry, it requires neither. Consumer lock-in is based only on the exhibition of behavioural loyalty (i.e. repeated use/purchase) due to the existence of switching costs.

In the case of habits of use, the switching costs develop as a result of brand-specific skill acquisition that reduces the time required to complete a consumption task using that particular brand. The automatic nature of such habits is evidenced by the response latencies of the decision maker when faced with a familiar task goal (Aarts and Dijksterhuis 2000b). As the habit becomes more ingrained – task performance becomes faster and faster as a result of practice – the preference for the incumbent product increases. At the extreme, habitual behaviour is autonomous, effortless and executed without any conscious control (Shiffrin and Schneider 1977), which results in decisions being made without any consideration of alternatives or even the awareness that alternatives exist. However, habitual behaviour can also be seen as a continuum rather than an all-or-none phenomenon (Aarts and Dijksterhuis 2000a; Bargh and Chartrand 1999; Logan 1988; Ouellette and Wood 1998). In this view, consumers are still aware that alternatives exist and some effort and control may be required, but they repeatedly choose the same set of actions to accomplish a particular goal because doing so reduces the total cost of purchase – a cost that includes time and effort in addition to the sticker price[3].

[3] This perspective is parallel to Cialdini's (2001) notion of "short-cuts" that reduce the amount of pre-decision processing.

Lock-in as a Result of Set-up and Evaluation Costs

It should be noted that Zauberman (2003) offers a time-discounting explanation of consumers becoming loyal to one interface in an environment that does not have traditional switching costs present. In essence, Zauberman looks at the choice environment in terms of the initial set-up costs (the time it takes to make the initial choice) and on-going evaluation costs (the cost of evaluating an alternative interface in the future). He argues that consumers choose the alternative that has the lower set-up costs and higher evaluation costs, and as a result they are less likely to consider alternatives or switch in the future. While I do not disagree with the results of this research given an environment that has either high set-up costs and lower evaluation costs or low set-up costs and higher evaluation costs[4], the results from Murray and Häubl (2002) indicate that lock-in can occur even when the consumer is forced to successfully complete a task with the alternative/competing interface. In this case, an evaluation of the alternative is forced, yet consumers remain locked-in to the incumbent interface. Because Zauberman's model holds ongoing usage costs constant (i.e., assumes that no learning occurs over time), his model provides no insight into lock-in that is caused by skill acquisition.

The Link between Learning and Preference

The research described herein makes a number of important contributions to the literature on consumer behaviour. First, this work introduces to the marketing literature the notion of habit as a hierarchical structure of automated skills that are goal activated.

[4] It should be noted, however, that Zauberman's framework cannot explain the success of real-world shopping features such as Amazon's one-click technology that create lock-in with high set-up costs and low evaluation costs.

This is significant because this definition of habit provides a link between consumers' skill acquisition and brand loyalty, which in turn provides a psychological mechanism for many of the predictions of the human capital model. In essence, the accumulation of human capital can lead to loyalty when it leads to habitual behaviour that is associated with, and activated by, specific consumption goals.

The second major contribution of this research is that it demonstrates, under controlled laboratory conditions, the potential of skill acquisition as a result of repeated experience to lock consumers in to a product, even when that product is objectively inferior prior to the acquisition of human capital. In addition, I examine a number of the key factors that have been hypothesized to affect this type of habitual choice behaviour: (1) the amount of practice with the incumbent interface, (2) the similarity of repeated experiences, (3) the consumer's usage goal, (4) the complexity of the consumption task, (5) the value of the consumer's time, and (6) constraints within the learning environment.

Third, on a managerial level, this research addresses the question of why consumers become locked-in to specific web sites even though the costs of searching for alternative interfaces, and switching to alternative interfaces, appear to be fairly low on the internet. In doing so, I posit an explanation for the imperative placed on rapid growth by the majority of dot coms, and thereby extend the literature on the first-mover advantage. Additionally, by demonstrating the central role of decisional control on consumer preference an important boundary condition on the first mover advantage is established.

The fourth major contribution relates to the literature on human-computer interaction and interface design. In particular, the proposed research suggests specific

strategies for software designers depending on their market position (first-mover or late entrant), the complexity of their product, consumers' usage goals and the nature of their target market with respect to time pressure (for example, leisure products versus business products). Consequently, this research has important implications for the management of any customer relationships that are mediated through an electronic interface.

CHAPTER 2: PRACTICE MAKES PREFERENCE

To most men experience is like the stern lights of a ship, which illuminates only the track it has passed.

Samuel Taylor Coleridge

Habits of Use and Consumer Choice

The three experiments described in this chapter investigate the potential for consumers to become locked-in to a particular interface as a result of brand-specific training. I conceptualize the process behind this type of lock-in as habitual task performance resulting from repeated practice with a particular web site interface to accomplish a specific goal. The primary task, common among the five experiments in this dissertation, requires participants to search through a web site to find a specific piece of information (i.e., the goal). The web site itself was designed to resemble a news site such as CNN.com or nytimes.com, and contains a series of pages that the participant must navigate in order to achieve the search goal assigned to them. Although the specific piece of information varies between trials, the sequence of pages that must be navigated (i.e., the navigation path) to find the target information remains constant. Initially, participants will have to make a choice among the paths available on each page. However, with practice, and given that the correct sequence of pages remains constant across trials, the opportunity exists to automate this navigation behaviour. The idea is that as task performance becomes increasingly habitual, the consumer becomes increasingly locked-in to the incumbent interface. This process of practice leading to the development of habitual behaviour, which in turn leads to high levels of loyalty, offers an explanation of the psychological mechanism underlying many of the predictions of the

human capital model. In essence, habit development reduces the time required to complete a consumption task and, as a result, increases the value of the interface that the consumer associates with that task. In this chapter I will lay out a number of hypotheses that are testable based on this conceptualization of the process behind lock-in through brand-specific training.

Pre-Tests

The purpose of the pre-test is to examine the users' a priori judgments of the three interfaces used as stimuli in the five experiments reported in this dissertation. Two of these interfaces were designed to be objectively equivalent: the primary difference between the two is that *Interface A* uses pull-down menus for navigation and *Interface B* uses radio buttons. The third interface (*Interface* C) was designed to be objectively superior to Interfaces *A* and *B* (see the screen shots of all three Interfaces in Appendix A). Interfaces *A* and *B* are described in more detail in Experiment 1, and are used throughout all five experiments, while *Interface C* is used only in Experiment 5.

Method & Procedure

Seventy-two (72) undergraduate psychology students participated in the pre-tests for course credit. Respondents were randomly assigned to evaluate one of the three interfaces in a between-subjects design. Each group was asked to rate the interface on (1) its effectiveness in completing the task, (2) the ease of navigation throughout the task, and (3) the enjoyment of using the interface. The precise wording for the ratings question was as follows: On a scale from 0 (very poor) to 9 (outstanding) rate the following aspects of the interface that you just used: (1) Effectiveness (2) Ease of navigation (3)

Level of Enjoyment. The task completion times were recorded for each of the three interfaces.

Regardless of which interface the participants were using, there was only one navigation path that would lead to the successful completion of the task. In addition, I measured how often participants navigated down the wrong path. While participants were allowed to follow other paths, they could only take one "step" off the correct path. In other words, participants were able to navigate to a web page that was not on the correct path; however, as soon as they arrived at that page they were informed that they had navigated off the correct path and were provided with a link that led them back to the previous (i.e., last correct) page. I have labeled these steps off the correct path as *missteps* and I measure the number of missteps that were made at each stage for each of the three interfaces in the pre-test.

Results

The mean ratings across all three scales were not significantly different for Interfaces A and B, but were significantly higher for Interface C. The mean *Effectiveness* ratings were 6.5 (A), 5.6(B), and 7.7(C). T-test comparisons illustrate that the Effectiveness ratings for A and C are significantly different (two-tailed $t = -2.609$, $df = 23$, $p = 0.016$) as are B and C (two-tailed $t = -3.571$, $df = 23$, $p = 0.002$), while A and B are not significantly different (two-tailed $t = 1.621$, $df = 23$, $p = 0.119$). The mean *Ease of Navigation* ratings were 6.4 (A), 6.3 (B), and 8.0 (C). T-test comparisons illustrate that the Ease of Navigation ratings for A and C are significantly different (two-tailed $t = -3.552$, $df = 23$, $p = 0.002$) as are B and C (two-tailed $t = -2.831$, $df = 23$, $p = 0.009$), while A and B are not significantly different (two-tailed $t = 0.188$, $df = 23$, $p = 0.853$). The

mean *Level of Enjoyment* ratings were 4.7 (A), 4.5 (B), and 6.2 (C). T-test comparisons illustrate that the difference in the Level of Enjoyment ratings for B and C are significantly different (two-tailed $t = -2.644$, $df = 23$, $p = 0.015$), while A and C are marginally significant (two-tailed $t = -1.837$, $df = 23$, $p = 0.079$). The difference in the Level of Enjoyment ratings for A and B are not significantly different (two-tailed $t = 0.202$, $df = 23$, $p = 0.842$).

Given the importance of task completion time in the theory presented thus far, task completion time is a key pre-test measure. Time was recorded in seconds from the beginning of the task (when participants were presented with the task description and the first page of the interface) until the navigation portion of the task was completed (participants successfully navigated to the target article). The task itself is held constant so that the only difference between the three groups is which interface they used to complete the task. As with the ratings, Interfaces A and B are equivalent, while Interface C is superior. The mean task completion times are as follows: Interface A: 126.1 seconds; Interface B: 108.0 seconds; Interface C: 64.3 seconds. The difference in task completion times between Interface A and Interface B is not significant ($t = 1.049$, $df = 23$, $p = 0.305$); however, the difference in task completion times between Interface A and C is significant ($t = 4.737$, $df = 23$, $p < 0.0001$), as is the difference between Interface B and Interface C ($t = 2.514$, $df = 23$, $p = 0.019$). Although there was no significant difference between Interfaces A and B, the mean task completion time with Interface B is less than that with Interface A. In light of the anticipated importance of task completion time in participants' interface choices, and to be conservative in the experimental

manipulations, Interface B is used as the competitor throughout the first four experiments.

The final pre-test measure was the average number of total missteps during the task. On this measure, there was no significant difference between any of the three interfaces. The mean number of missteps for A and B were identical (5.1), and the mean missteps for Interface C were slightly lower (4.9) but not significantly different (two tailed t-test comparing A to C: $t = 0.152$, $df = 23$, $p = 0.881$; two tailed t-test comparing B to C: $t = 0.175$, $df = 23$, $p = 0.862$). The pre-tests indicate that while Interfaces A and B are equivalent on a number of dimensions, Interface C is a superior interface on all of the same dimensions with the exception of the average number of missteps.

Experiment 1

First and foremost, Experiment 1 was designed to test the fundamental premise of this research: practice leads to preference. This is based on the idea that with practice consumers acquire knowledge and skill that make the incumbent product, brand, or service more valuable than competitors that initially would have been judged equivalent to the incumbent. Specifically, consumers that have learned to habitually achieve a given goal with a specific set of actions using an incumbent product should find it very difficult to transfer from the incumbent to competitors. If learning to use the incumbent interface results in the development of non-transferable skills that create a switching cost, as predicted above, it should be difficult for participants to transfer from the incumbent interface to a competitor interface. In particular, individuals that have developed non-transferable skills specific to the incumbent interface should see their task completion time increase when they use the competitor – i.e., they should experience a slow down in

the time required to complete the task (Foss and DeRidder 1988; Underwood 1957). This effect can be measured as the *relative task completion time* (RTCT), by subtracting the time it takes to complete the task (T_c) using a competitor from the time it takes to complete the task the last time (T_{li}) the participant used the incumbent ($RTCT = T_{li} - T_c$). Therefore, when participants are slower to complete the task using the competitor, RTCT will be negative; and when participants are faster at completing the task using the competitor, RTCT will be positive. The extent to which skill acquisition affects choice can be assessed by the ability of the RTCT measure to predict choice. This prediction comes directly from human capital models of human behavior (e.g., Ratchford 2001), and leads to the following formal hypotheses.

Hypotheses for Experiment 1

The power law of practice governs the learning function for a very wide variety of cognitive and motor tasks. Therefore, it is reasonable to expect that practice using a web site interface will result in a similar pattern of performance. This suggests a reduction in both the mean time required to complete the task and in the standard deviation across subjects of the time required to complete the task consistent with the power law of practice (Murray and Häubl 2002; Logan 1988). Specifically,

$H_{1.a}$: Practice with a particular interface results in a reduction in the time required to complete the task that can be approximated by the power law of practice.

$H_{1.b}$: Practice with a particular interface results in a reduction in the standard deviations of the time required to complete the task that can be approximated by the power law of practice.

The reduction in the time required to complete the task is evidence of skill acquisition (Newell and Rosenbloom 1981). As this reduction in time reaches an asymptote we can

expect that some or all of the skills required to complete the given task with the incumbent interface have become automated and no longer require as much effort or conscious control (Logan 1988; Shiffrin and Schneider 1977). Following the view of habits as goal-directed and automated behaviours (Aarts and Dijksterhuis 2000a), each time the task goal is presented and the consumer uses the interface to achieve that goal, the behaviour becomes more habitual. This progression towards faster, more habitual behaviour, results in a change in the subjective value of the incumbent interface relative to other competing interfaces (Ratchford 2001). As human capital accrues specifically to the incumbent interface – as a result of the skill, knowledge and expertise that develop with practice – the incumbent interface becomes more useful to the consumer (Wernerfelt 1985). Therefore,

> H_2: As the amount of practice with the incumbent interface increases, the likelihood of switching to a competing interface decreases.

In addition to the repeated pairing of a goal with a set of actions, it has been argued that the development of habitual behaviour requires that this pairing occur under highly similar circumstances (Bargh and Chartrand 1999; Ouellette and Wood 1998). Specifically, the more similar the behaviour is every time it is repeated, the faster it becomes automated. In a consumer context the speed with which brand related behaviours become habitual directly affects the amount of human capital that accrues to that brand. Therefore,

> H_3: As the similarity of repeated experiences with the incumbent interface increases, the probability of switching to a competing interface decreases.

Method & Procedure

Two hundred and forty-five undergraduate psychology students participated in Experiment 1 for course credit. All respondents were asked to use an incumbent interface (*Interface A*) to find a specific piece of information by searching through a news web site designed for this experiment and fashioned roughly on popular internet news sites (e.g., www.nytimes.com). However, the number of times that participants completed this task varied between experimental conditions. Specifically, there were nine levels of the independent variable *incumbent trials* – i.e., the amount of practice the participants had at completing the task with the incumbent interface. This variable was operationalized by randomly assigning participants to complete the task from 1 to 9 times (1, 2, 3 … 9 incumbent trials). In addition, participants were randomly assigned to one of two navigation path conditions: same route or changing route. In the same route condition, participants had to complete the task by navigating through the same series of web pages. In the changing route condition participants had to navigate through a different series of web pages, on each trial, in order to successfully complete the task. Therefore, the design of the experiment is a 2 (similarity of the navigation path between trials) by 9 (number of incumbent trials) between subjects design.

For example, during the first incumbent trial participants were told that their task was to "Navigate through the web site to find the November Science Column entitled 'Seeking Deeper Meaning' and enter the age (in months) of the baby mentioned in the first paragraph." To find this information the participant had to navigate through a series of web pages, as follows: portal homepage → Science Articles → Science Columns → November Articles → "Seeking Deeper Meaning" → The Article (the full article and a

text box for entering the answer were available at this stage). At any stage if the participant navigated down the wrong path s/he was informed that "The articles you requested are not currently available. Please click here to return to the previous page." If the answer was incorrectly entered, the participant was told that the answer was incorrect and was referred back to The Article. If the participant was in the same navigation path condition, then on the next trial they were told that their task was to "Navigate through the web site to find the November Science Column entitled 'Telescopes find Miniplanet' and enter the year in which the planet Pluto was discovered," which would require the following navigation (the same as it was the first time the task was completed) in order to reach the appropriate story: portal homepage → Science Articles → Science Columns → November Articles → "Telescopes find Miniplanet" → The Article (the full article and a text box for entering the answer were available at this stage). If the participant was in the changing navigation path condition, on the second trial they were told that their task was to "Navigate through the web site to find the January Space Science Article entitled 'Telescopes Find Miniplanet' and enter the year in which the planet Pluto was discovered," which would require the following navigation (different from the first time the task was completed) in order to reach the appropriate story: portal homepage → Science Articles → Space Articles → January Articles → "Telescopes find Miniplanet" → The Article (the full article and a text box for entering the answer were available at this stage). In all conditions, once the participant typed in the correct answer, the trial was complete.

After completing the task with the incumbent interface for each of the assigned number of incumbent trials, participants were required to use an alternative interface

(*Interface B*), which was functionally equivalent to *Interface A* (see Pre-tests), to complete another information search task. The similarity of the navigation path manipulation carried forward throughout the competitor trial and the final trial (i.e., throughout the entire experiment). After using the alternative interface (*Interface B*), respondents were asked to choose between interfaces *A* and *B* to complete one more information search task. At the same time, they were asked to rate the extent of their preference for the interface that they had chosen[5]. This graded-paired-comparison measure is used to obtain more precise information (strength of preference) than a simple paired choice design would allow (Elrod and Chrzan 1999). The respondent was then required to complete a final trial using the interface s/he had chosen. After completing the final trial, each participant responded to a short survey comprised of manipulation checks and additional rating scale measurements (see Table 2). They were then debriefed and the experiment was complete. Experiment 1 was designed to test Hypotheses 1 through 3.

[5] Based on both the observed choices and the extent-of-preference measures, I constructed a 21-point zero-centered graded-paired-comparison (GPC) response variable (with end points –10 = "very strongly prefer the competitor" and +10 = "very strongly prefer the incumbent") that allows a quantitative representation of a person's relative preference for the two interface alternatives in a choice set.

Table 2: Experiment 1 – Post-Experiment Questions

1	I liked the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
2	I trusted the interface that I chose to use for the last trial (1 Strongly Disagree to 7 Strongly Agree)
3	I felt there was less risk in using the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
4	I found the site I chose easy to navigate. (1 Strongly Disagree to 7 Strongly Agree)
5	I found Interface A easy to use. (1 Strongly Disagree to 7 Strongly Agree)
6	I found Interface B easy to use. (1 Strongly Disagree to 7 Strongly Agree)
7	I would recommend Interface A to others. (1 Strongly Disagree to 7 Strongly Agree)
8	I would recommend Interface B to others. (1 Strongly Disagree to 7 Strongly Agree)
9	I found the first interface easier to use after the first couple of trials (this question only for those who have more than 2 trials) (1 Strongly Disagree to 7 Strongly Agree)
10	I gained skill at using Interface A. (1 Strongly Disagree to 7 Strongly Agree)
11	The more practice I had with an interface the better I was at completing the task. (1 Strongly Disagree to 7 Strongly Agree)
12	If you had no experience with either interface, which would you choose? (Interface A or Interface B)
13	During the study, why did you choose the interface that you chose? (open-ended)
14	How much experience do you have with the internet? (1 No Experience to 7 A Great Deal of Experience)
15	How old are you? (open-ended)
16	What is your gender? (male or female)

Results

First, I look at the task completion times for evidence that learning occurred across trials. For this analysis I focus on the navigation phase of the task (i.e., the four webpages that must be navigated before the participant can select the appropriate article), because this is the portion of the task that is the most consistent, and therefore the most amenable to improvement over trials. In particular, I predicted that the task completion times (H1a – see Figure 2) and the standard deviations of the task completion times (H1b – see Figure 3) across 9 trials would be well approximated by a power function. The analysis here is focused on the two experimental conditions that included 9 trials with the incumbent interface, as those are the conditions with complete learning curves. An

analysis of variance (ANOVA) conducted on the individual-level log completion times for the 9 trial condition indicates that the completion times are not significantly different at conventional levels on any of the 9 trials between the two navigation path conditions (1 trial: $M_{same} = 135.070$, $M_{change} = 136.770$, p-value = 0.953; 2 trials: $M_{same} = 35.786$, $M_{change} = 39.692$, p-value = 0.559; 3 trials: $M_{same} = 26.929$, $M_{change} = 39.629$, p-value = 0.159; 4 trials: $M_{same} = 26.357$, $M_{change} = 39.923$, p-value = 0.099; 5 trials: $M_{same} = 33.357$, $M_{change} = 39.923$, p-value = 0.525; 6 trials: $M_{same} = 20.286$, $M_{change} = 24.000$, p-value = 0.398; 7 trials: $M_{same} = 18.071$, $M_{change} = 18.846$, p-value = 0.622, ; 8 trials: $M_{same} = 17.357$, $M_{change} = 18.308$, p-value = 0.501; 9 trials: $M_{same} = 17.000$, $M_{change} = 17.231$, p-value = 0.880). Therefore, our analysis of the learning curves is collapsed across the two 9-trial conditions (see Figures 2 and 3). In both cases the data are fit well by a power function. As compared to the benchmark fit of a linear regression model (in brackets), the R^2 for the power function model of the task completion times across the nine incumbent trials is 0.892 (0.494), and for the standard deviations of the task completion times the R^2 is 0.781 (0.605). Overall, these findings provide support for H1a and H1b.

Figure 2

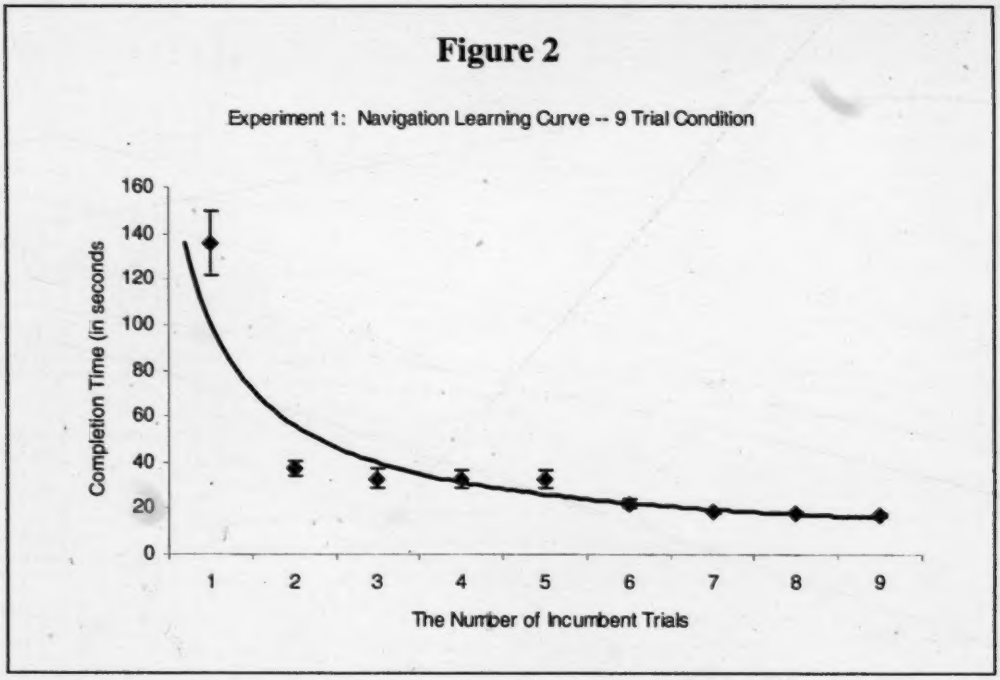
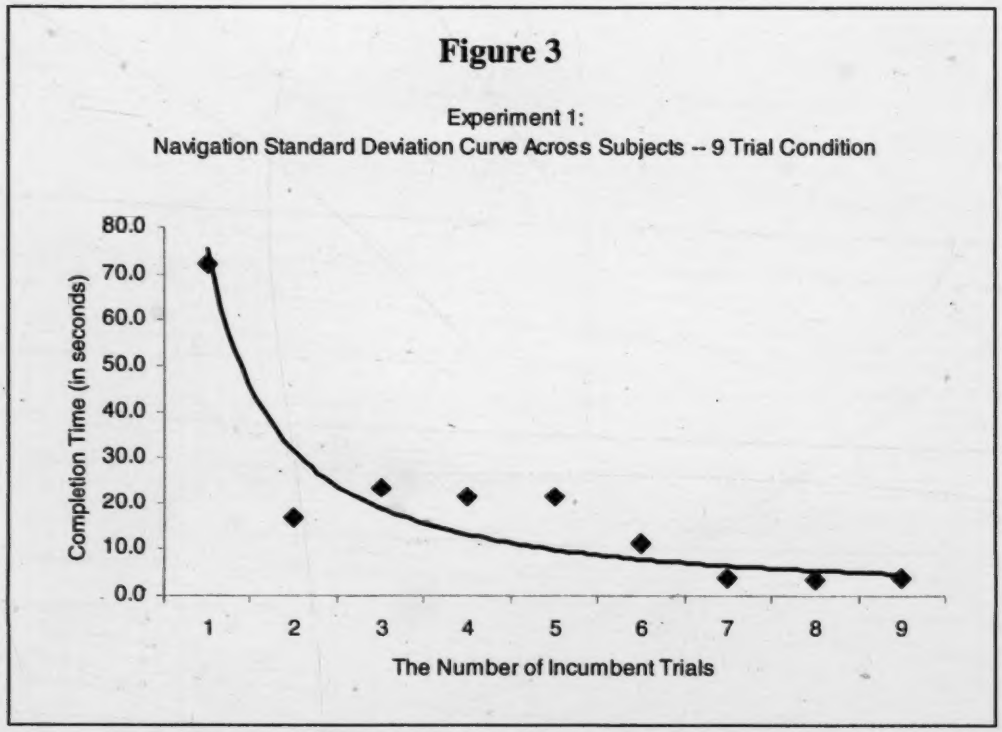


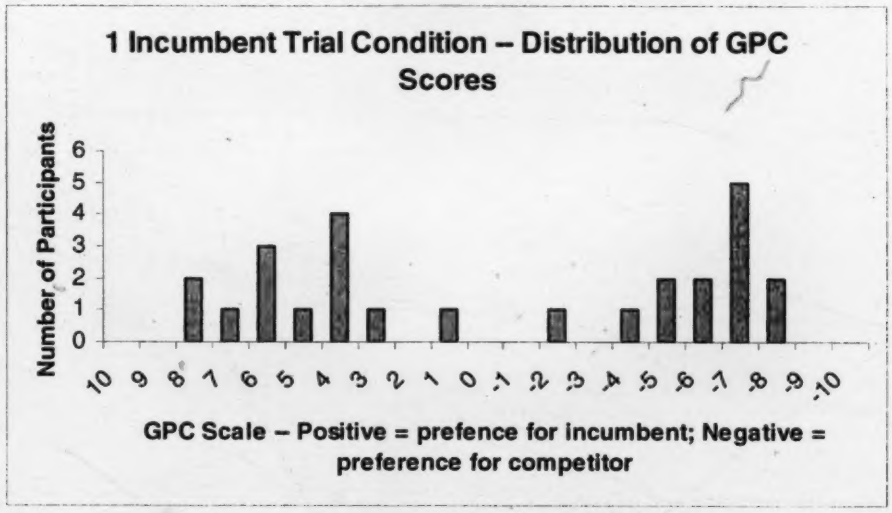
Figure 3



Before testing H_2 and H_3, it is informative to look at the extent of preference data in more detail to determine the strength of the preferences expressed by participants when they are choosing an interface to use for an additional trial. One of the key advantages of collecting the extent of preference data is that it allows for the identification of weak preferences in situations where a choice is forced (e.g., as in Experiment 1, when participants must select one of two options). However, it is clear from the data in this experiment that the preferences expressed by participants are strong, which results in a bi-modal distribution of the preference data in all conditions (see for example the distribution of the preference data from the 1 and 9 incumbent trial conditions, Figure 4). As a result, all hypotheses will be tested using the choice data because it reflects strong preferences, and because the severe non-normality of the graded-paired-comparison distributions renders traditional statistical analyses inappropriate with the preference data.

Therefore, Hypotheses 2 and 3 were tested simultaneously using a logistic regression with interface choice as the dependent variable, and independent variables for the two conditions (number of incumbent trials and navigation path) as well as an interaction term (number of incumbent trials by navigation path). The results of the logistic regression indicate that the number of incumbent trials does have a significant effect on the probability of the incumbent being chosen ($\chi^2 = 4.767$, p-value = 0.029); however, the coefficients for the navigation path ($\chi^2 = 1.148$, p-value = 0.284) and the interaction term are not significant at conventional levels ($\chi^2 = 0.404$, p-value = 0.525). These results provide support for H2, but not for H3. The choice shares by the number of incumbent trials completed prior to exposure to a competitor (collapsed over navigation path) are presented in Figure 5.

Figure 4


1 Incumbent Trial Condition – Distribution of GPC Scores
Number of Participants
0
1
2
3
4
5
6
10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10
GPC Scale – Positive = prefence for incumbent; Negative = preference for competitor

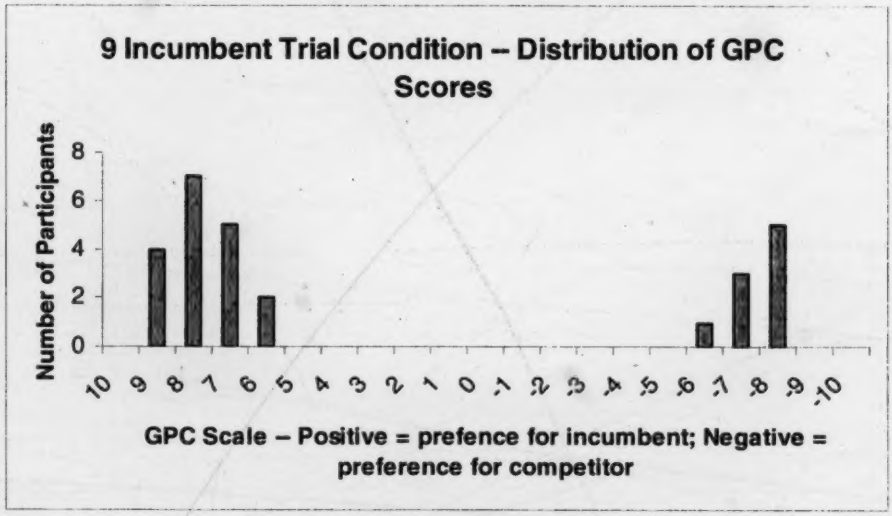
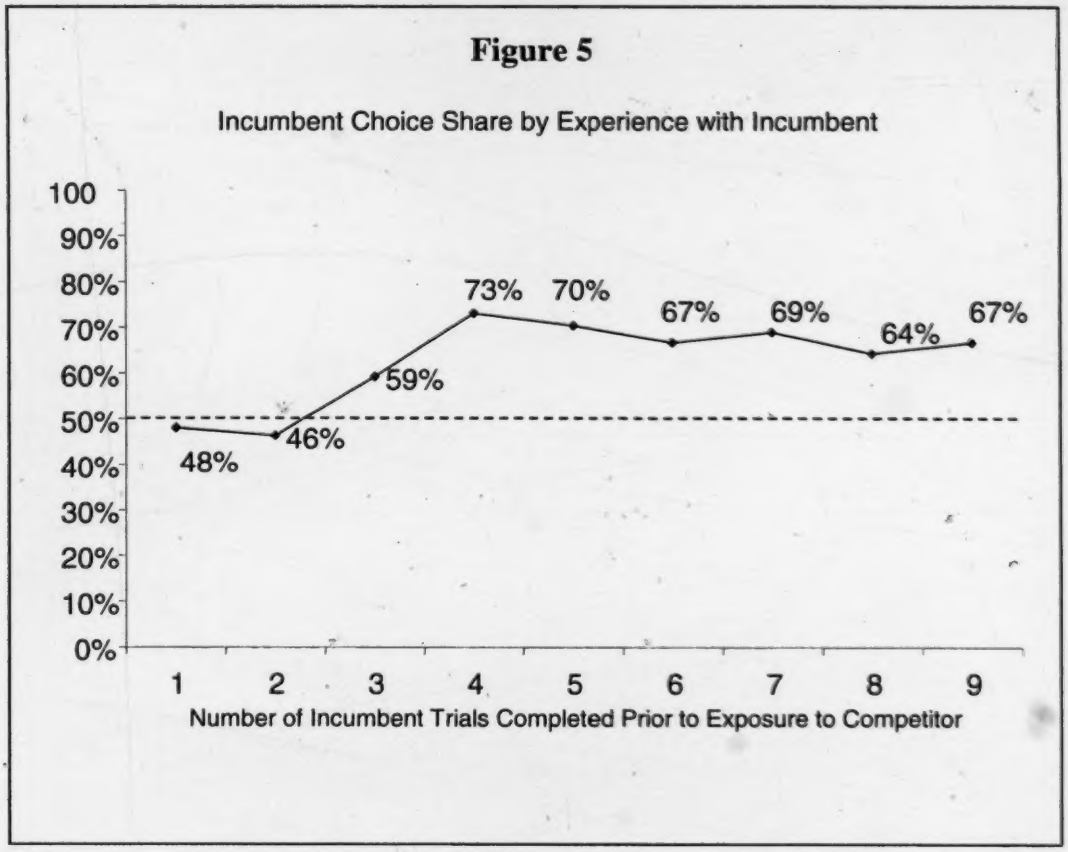

9 Incumbent Trial Condition – Distribution of GPC Scores
Number of Participants
0
2
4
6
8
10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10
GPC Scale – Positive = prefence for incumbent; Negative = preference for competitor

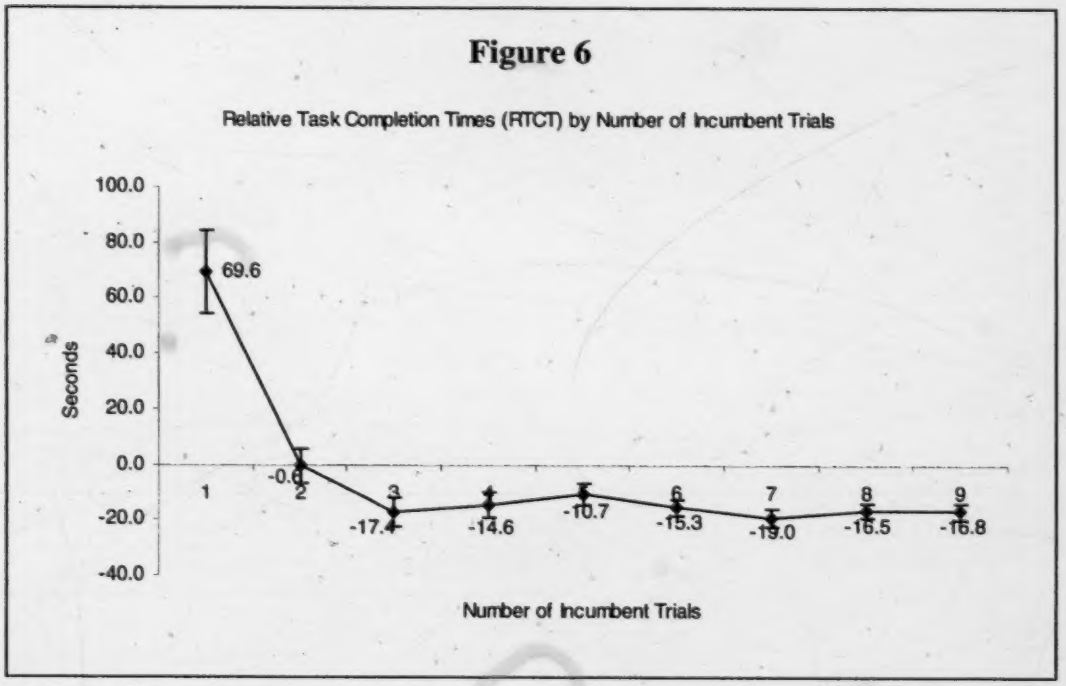
Figure 5



The above analysis clearly indicates that the number of trials completed using the incumbent interface before being exposed to the competitor has a significant positive effect on the incumbent's choice share relative to the competitor. However, I have argued that this effect should be mediated by the degree of skill transferability as measured by the RTCT metric. To test for mediation, I use the 4-step Baron and Kenny procedure (1986; see also, Judd and Kenny, 1981). The first step of the procedure establishes that there is an effect that may be mediated by examining the correlation between the initial variable (the number of incumbent trials) with the outcome variable (interface choice). This is done using a logistic regression with the number of trials as the independent variable and incumbent choice as the dependent variable. The results

indicate a clear effect of the number of incumbent trials on interface choice ($\chi^2 = 4.828$, p-value = 0.028). The second step is to demonstrate that the initial variable (the number of incumbent trials) affects the mediator (RTCT), which is accomplished using an OLS regression with the number of trials as the independent variable (linear and quadratic terms) and RTCT as the dependent variable. As expected, the results demonstrate that the number of trials do have a strong negative effect on RTCT (linear term: β=-6.243, SE = 1.134, F(1, 243) = 30.28, p-value < 0.0001; quadratic term: β=-0.4512, SE = 0.114, F(2,242)=37.67, p<0.0001). The mean RTCTs[6] between participants and across incumbent trials are illustrated in Figure 6.

Figure 6



[6] Appendix C details the means for the *Last Incumbent Trial* and the *Competitor Trial*, as well as the mean RTCT and the standard errors, for each of the 9 practice conditions.

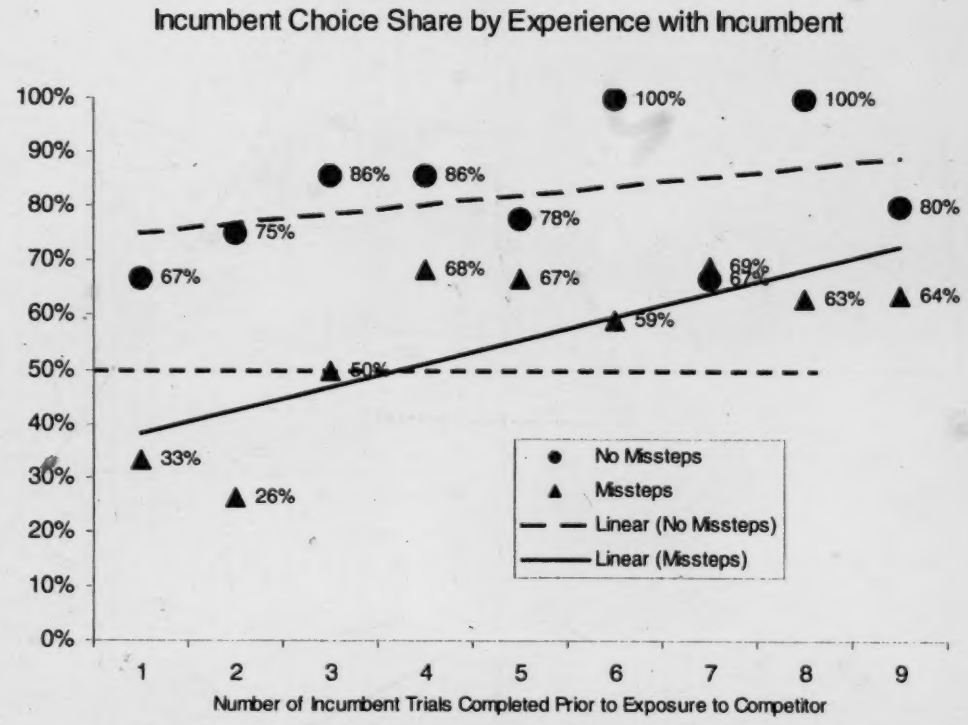
The third step is to demonstrate that the mediator (RTCT) affects the outcome variable (interface choice), while controlling for the impact of the initial variable (the number of incumbent trials). Complete mediation is established if the effect of the number of incumbent trials on interface choice is not different from zero when RTCT is included in the model (the forth step). A logistic regression was used to test for complete mediation with the number of incumbent trials and RTCT as the independent variables, and interface choice as the dependent variable. Complete mediation is established as RTCT has a significant effect on interface choice ($\chi^2 = 7.033$, p-value = 0.008) and the effect of the number of incumbent trials on interface choice is not significantly different from zero in this model ($\chi^2 = 1.628$, p = 0.202).

It is clear from the above analysis that skill acquisition plays a central role in consumers' choice of interfaces. Further analysis indicates that *misstepping* (i.e., navigating down an incorrect path) also has an impact on choice. When a missteps dummy variable is included in the logistic regression model (0 = no missteps; 1 = at least one misstep), it is apparent that those participants who navigate off the correct path are much less likely to choose the incumbent interface (see Table 3). However, there is no interaction between missteps and Tasks, which indicates that while misstepping suppresses the probability of choosing the incumbent, with additional trials participants do come to prefer the incumbent (see Figure 7).

Table 3: Experiment 1 – Logistic Regression Results

	Coefficient Value	χ^2	p-value
Path Condition	0.217	1.149	0.284
Number of Trials	0.100	4.940	0.026
Missteps	-1.769	15.421	< 0.0001
Path Trials*	-0.017	0.108	0.742
*Path*Missteps*	0.208	0.262	0.608
*Trials *Missteps*	0.094	0.326	0.568
Path Trials *Missteps*	-0.014	0.007	0.932

Figure 7



Not surprisingly, misstepping strongly affects the total amount of time it takes to navigate to the target article during the incumbent trials, as indicated by an OLS regression (M = 155.42, 274.46, β=119.04, SE = 15.261, F(1,243) = 60.84, p-value < 0.0001). This suggests that participants who misstep are finding Interface A more difficult to use, as compared to participants that do not misstep. Based on an OLS regression examining the impact that misstepping has on the perceived ease of using Interface A (post-experiment rating-scale measure Question 5, see Table 2), I find that participants who misstep perceive Interface A to be more difficult to use (M = 8.211, 7.165, β = -1.046, SE = 0.346, F(1,243) = 9.14, p-value < 0.003). It is also worth noting that misstepping accounts for approximately 29% of the variance in the time it takes to navigate to the target article during the incumbent trials (R^2 = 0.288). In combination, misstepping and the number of tasks account for the majority of the variance in navigation task completion times (R^2 = 0.575).

Interestingly, while missteps have a strong effect on choice, the total navigation times during the incumbent trials do not (logistic regression, χ^2 = 1.883, p-value = 0.170). On the other hand, the total number of missteps does affect RTCT (OLS regression, β = -0.942, SE = 0.383, F(1,243) = 6.046, p-value = 0.015). However, RTCT does not completely mediate the impact of missteps on choice, as each has a significant effect on choice (in a logistic regression) while controlling for the other (RTCT: χ^2 = 6.946, p-value = 0.008; missteps: χ^2 = 10.306, p-value = 0.001; RTCT*missteps: χ^2 = 0.732, p-value = 0.392). Similarly, missteps does not completely mediate the effect of the number of incumbent trials on choice (see Table 3).

The final set of tests is related to the rating-scale measures and manipulation checks collected after the tasks were complete (see Table 2). It is reasonable to expect that responses to question 5 (I found Interface A easy to use) are predictive of interface choice. This is true because if skill acquisition is affecting choice then to the extent that skill acquisition makes the interface easier to use, the ease of using Interface A should predict choice (i.e., higher perceived ease of using A means a greater probability of choosing A). Question 6 (I found Interface B easy to use) should also be predictive of interface choice, but in the opposite direction: the easier Interface B is to use the more likely Interface B (the competitor) will be chosen. I included all of the post-task questions (Table 2) as independent variables in a logistic regression with choice as the dependent variable. Of the post-task questions, only question 5 ($M = 5.720, 8.441, \chi^2 = 87.706$, p-value < 0.0001), question 6 ($M = 8.054, 6.382, \chi^2 = 91.026$, p-value < 0.0001) and question 12 ($M = 1.893, 1.224, \chi^2 = 12.432$, p-value $= 0.0004$) have a significant effect on choice at conventional levels. Given the above analysis, it was expected that question 5 and 6 would be predictive of interface choice; however, it is interesting that question 12 is also predictive of the final interface choice. The data indicate that participants who chose A say they would have chosen A regardless of how much experience they had with either interface, and those who chose B say they would have chosen B regardless of the amount of experience they had with either interface. Although it is clear from the results presented above that practice with the incumbent has a significant effect on choice, it does not appear that participants in this experiment are attributing the choice they make to the amount of experience they had with the two interfaces. This is further reinforced by the lack of a significant effect of Question 10 ("I

gained skill at using Interface A") on choice (M = 6.979, 8.132, logistic regression, χ^2 = 12.432, p-value = 0.742).

Discussion

The results of the first experiment clearly support the fundamental premise that with practice skill is acquired and, as a result, the incumbent becomes preferred. The data clearly indicate that as the number of trials with the incumbent increases, the incumbent's choice share increases. Moreover, this effect is completely mediated by the participant's ability to transfer from the incumbent interface to the competitor, and alternative explanations such as liking, trusting or perceiving less risk in the incumbent appear to have no effect on interface choice. While the rating-scale measures do not definitively rule out these alternative explanations, they do make them less plausible. Interestingly, although perceived ease of using Interface A is predictive of choice, participants themselves do not appear to attribute the choices that they make to the experience they have had with the Interfaces. Instead, they report that they would have chosen the interface that they did regardless of the amount experience they had, or the skill they acquired, with Interface A.

The navigation path manipulation did not affect the participants' speed of performance with the incumbent, nor did it affect the interface choices that participants made. It is likely that this is the result of an overly subtle manipulation. With only two "clicks" of the navigation path changing across trials, participants were able to adapt well and perform the task as rapidly as participants in the same-navigation-path condition. On one hand, it seems reasonable to suspect that if the task demands were to change more dramatically from trial to trial that the speed of task performance would be diminished

and the choice of interfaces would be affected. On the other hand, the lack of an effect between the navigation path conditions does indicate that task performance can produce similar learning curves even when the task is not identical across trials. From a generalizability perspective, this suggests that the basic finding is robust to at least minor changes in the task over time.

In addition, because the impact of the number of tasks on choice behavior is completely mediated by RTCT, the results of the first experiment cannot be explained by mere exposure (Zajonc 1968) or simple familiarity (Johnson and Russo 1984). Both of these alternative explanations would predict a direct effect of the number of incumbent trials on choice; and neither would predict the important mediating role being played by skill transferability (RTCT). Along the same lines, it is worth noting that the total navigation time does not have a significant effect on choice; rather than absolute performance over all trials, choice is being driven by the difference in task performance between the last incumbent trial and the competitor trial (RTCT).

Another important determinant of interface choice is whether or not navigation errors (i.e., missteps) were made as participants searched for the target information. Such errors decrease the ease of using the product, as evidenced by task completion times and the participants' self-reported perceptions of ease of use, and increase the probability of switching to the competitor. It appears that by slowing down the task completion times usage errors impede habit formation and, as a result, reduce the value of practice with the incumbent. Conceptually, such errors are a potential source of product *dis*satisfaction because they reduce the usability of the product and, therefore, reduce the ability of the product to satisfy the needs of the consumer. According to Oliver (1999) such

dissatisfaction may be the "Achilles heal" of consumer loyalty. The following experiments, and Experiment 4 in particular, provide additional insight into the impact that misstepping has on the development of loyal behavior. In the general discussion section, at the end of this dissertation, I discuss in more depth the relationship between product misuse, dissatisfaction, and consumer loyalty.

To further investigate the role of skill-based habits of use in consumer choice, Experiments 2 and 3 examine the role of goal-activation. Goal-activation is critical in the development and initiation of habitual behaviour, and is predicted to have an important impact on the choices consumers make. At the same time, alternative explanations based on liking, trust or risk do not predict that goal-activation plays a central role in consumer choice. In addition, Experiment 2 examines the tendency of participants to try a new alternative interface, after using an incumbent, but without having experienced any other interface. This differs markedly from the first experiment in which all participants were required to use the competing interface before making a choice. Therefore, Experiment 1 was a conservative test of the effect of practice on preference formation, as it is possible that, having learned to use an incumbent product satisfactorily, consumers will be reluctant to even try an alternative.

Experiment 2

In most repetitive consumption situations, consumers have a choice between continuing to use the product that they have used in the past and switching to a different product. Experiment 2 was designed to examine the tendency of participants to try a novel alternative interface (i.e., one they have never seen before) after they had practice using an incumbent. Therefore, in Experiment 2 participants are *not* forced to use a

competitor. Instead, an alternative interface is simply made available to them after they have completed their trials with the incumbent.

Experiment 2 also follows up on the prediction that the behavior observed in Experiment 1 is goal-directed. Aarts and Dijksterhuis (2000a) have argued that simply activating an alternative goal will prevent a habitual response. Following this assumption, Experiment 2 examines the impact that activating a new task goal, at the same time that consumers are asked to choose an interface, has on the incumbent's choice share. My expectations for this experiment are stated below as formal hypotheses.

Hypotheses for Experiment 2

In Experiment 1 participants were required to use an alternative interface and as a result are aware of the relative merits of the interface they have been using as compared to the alternative interface; even if their judgment of *Interface B* is affected by their experience with *Interface A*. However, it is important to remember that one of the key benefits of habitual consumption behaviour is to reduce the amount of pre-decision analysis required (Cialdini 2001; Stigler and Becker 1977). In fact, Wernerfelt (1985) has argued that skill acquisition will at some point stop a consumer's search for alternative products. This is consistent with the definition of habits as goal-directed and automated behaviours, which suggests that, with enough practice, the presence of a consumption goal can activate behaviours that are to some degree autonomous and outside of conscious control (Aarts and Dijksterhuis 2000a). In addition, empirical evidence exists that suggests that increasing practice with a web site results in reduced search behaviour (Johnson et al. 2003). Therefore,

H_4: The more practice consumers have with a particular interface, the less likely they are to try a novel competing interface.

The Essential Role of Goal Activation

As previously discussed, skill acquisition and skill automation alone are not sufficient to explain loyalty that results from the accumulation of brand-specific human capital. The key link between skill acquisition and consumer choice is the activation of those acquired and automated skills in the presence of the same usage goal. The conceptualization of habit as goal-directed automated behaviour connects the acquisition of skill to the development of consumer loyalty. Therefore,

H_5: Consumers are more likely to try a novel competing interface when a different usage goal is activated.

H_6: The effect of practice on the probability of trying a novel competing interface (H_5) is reduced when the consumer's usage goal differs from the goal that was present when the consumer learned to use the interface.

Method & Procedure

One hundred and three undergraduate psychology students participated in Experiment 2 for course credit. Experiment 2 was designed to examine the tendency of online consumers to consider alternative interfaces to complete a task that they have already completed with an incumbent interface. In addition, this experiment was designed to test the importance of the goal in activating behaviour. Subjects were randomly assigned to complete either 1 or 9 trials with the incumbent interface given an information search goal (as in Experiment 1). Subjects were also assigned to one of two goal activation conditions. In the *same* goal activation condition, subjects were asked to choose between the incumbent interface and a competing interface to complete one more information search task (i.e., the same goal as in previous trials). In the *different* goal

activation condition, subjects were asked to choose between the incumbent interface and a competing interface to complete a new and different task (i.e., a different goal from previous trials). The different task required participants to post their opinion in response to the following question: "Do you agree with the article below, entitled *Prime Time Gets Real With a Plump Heroine*, that there has recently been a move to casting more 'real-sized' women in TV." This is distinct from the previous task that required the subject to search for a particular piece of information.

Therefore, the design of the experiment was a 2 (goal activation; same or different) by 2 (number of trials; 1 or 9). It is important to note that the difference between this experiment and Experiment 1 is that the participants were *not forced* to try an alternative before making their choice. In all conditions, subjects were given the option of continuing on with the incumbent interface or trying the alternative. This manipulation was designed to test H_4, H_5 and H_6. After completing the final trial, each participant responded to a short survey comprised of manipulation checks and additional rating-scale measures (see Table 4). They were then debriefed and the experiment was complete.

Results

Hypotheses 4, 5 and 6 can all be tested simultaneously using a logistic regression with choice shares as the dependent variable and independent variables based on the experimental conditions (number of incumbent trials, goal activation, and an interaction term for number of incumbent trials by goal activation). The results indicate that none of the coefficients for the independent variables approach significance (number of trials, $\chi^2 = 0.035$, p-value = 0.851; goal activation, $\chi^2 = 0.044$, p-value = 0.834; interaction term,

$\chi^2 = 0.978$, p-value = 0.322). Therefore, Hypotheses 4, 5 and 6 are not supported for these data.

Although the data do not support any of the hypotheses for Experiment 2, it is worth noting that, collapsed across conditions, 36.9% of the participants tried the competing interface. It is also worth to examining participants' responses to the open-ended post-task question 1: "Why did you chose the interface that you did?" Those that chose to try the competitor rather than continuing to use the incumbent cited two main reasons: 71.1% said they wanted to try something new and 21.1% said they disliked the incumbent. Of the participants that chose to continue using the incumbent, 78.5% explained that they already knew how to use it.

Table 4: Experiment 2 – Post-Experiment Questions

1	Why did [didn't] you try the alternative interface that was presented to you? (open-ended)
2	I liked the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
3	I trusted the interface that I chose to use for the last trial (1 Strongly Disagree to 7 Strongly Agree)
4	I felt there was less risk in using the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
5	I found the site I chose easy to navigate. (1 Strongly Disagree to 7 Strongly Agree)
6	I found Interface A easy to use. (1 Strongly Disagree to 7 Strongly Agree)
7	I would recommend Interface A to others. (1 Strongly Disagree to 7 Strongly Agree)
8	I gained skill at using Interface A. (1 Strongly Disagree to 7 Strongly Agree)
9	How much experience do you have with the internet? (1 No Experience to 7 A Great Deal of Experience)
10	How old are you? (open-ended)
11	What is your gender? (male or female)

The rating-scale measures collected at the end of the survey (see Table 4) provide additional insight into the results of Experiment 2. A logistic regression with choice as the dependent variable and each of the rating-scale questions as independent variables suggests that perceptions of risk (Question 4) are highly predictive of interface choice (χ^2

= 69.628, p-value < 0.0001); however, none of the other measures (see Table 4) had an impact at conventional levels (p-values > 0.05). Post hoc, this makes sense. Without ever having seen or experienced the alternative interface, choosing an interface is no longer based on skill acquisition (which clearly favours the incumbent), and instead it appears to be based on the participant's acceptance of the risk inherent in trying a product with which one has no experience. In fact, those who chose to stay with the incumbent for the last trial averaged a rating of 7.952 on Question 4, while those who tried the competitor averaged a rating of 3.605. These ratings are significantly different (ANOVA F(1,99) = 111.999, p-value < 0.0001). The fact that those who chose the competitor appear more willing to accept risk is very consistent with the search for novelty that, according to most participants, motivates their willingness to try Interface B.

Table 5: Experiment 2 – Logistic Regression Results

	Coefficient Value	χ^2	p-value
Goal Condition	0.237	0.044	0.834
Number of Trials	0.353	0.035	0.851
Missteps	-5.774	2.202	0.138
Goal Trials*	-0.162	1.174	0.278
*Goal*Missteps*	4.314	1.325	0.250
*Trials *Missteps*	0.375	0.850	0.357
Goal Trials *Missteps*	-0.389	2.172	0.141

In light of the important role that missteps had on choice in Experiment 1, it is worth examining the effect that they have here as well. Table 5 details the results of a logistic regression with interface choice as the dependent variable and goal condition, number of incumbent trials and missteps, as well as their interactions, as the independent variables. It is clear from this analysis that missteps do not have an effect on the

tendency of participants to try an alternative interface, even though missteps had a significant impact on the choice of interfaces in Experiment 1. However, given that misstepping moderates the impact of the number of incumbent trials on choice, and in this experiment there is no effect of the number of incumbent trials on choice, it is unsurprising that missteps do not affect the tendency to try an alternative interface. When habitual use of the product is not driving the choice decision, impeding habit formation by misstepping should not (and does not) affect choice.

Discussion

The results of Experiment 2 suggest that a single trial is enough to prevent the majority of participants from trying an alternative interface, and that additional experience with the incumbent does not reduce the number of participants who are willing to try an alternative interface. In contrast to Experiment 1, the analysis of the rating-scale data suggests that the decision to try the competitor is highly correlated with by the participant's willingness to accept risk. Moreover, the open-ended responses indicate that, of those who do try the competitor, the majority do so seeking to try something new[7].

Of greater concern is the lack of a difference between the goal activation conditions. Given the prediction of Aarts and Dijksterhuis (2000a) that activating an alternative goal should substantially reduce or eliminate habitual responding – and the design of the experiment which makes the habitual responses learned under the information search goal of little use when posting an opinion – the "post your opinion"

[7] This motivation for variety seeking is consistent with what McAlister and Pessemier (1982), in their review of variety seeking behaviour, categorize as a *direct motivation*.

goal condition should have resulted in a much lower incumbent choice share than the information search goal condition.

Again, however, the design of the experiment is such that the participants have never posted their opinion with either interface. Moreover, they have no experience at all with the competitor. Thus, there is a great deal of uncertainty surrounding both interfaces when it comes to posting an opinion. For the competitor that uncertainty is compounded by a more general ambiguity about Interface B, as it has never been used. The rating-scale data support this explanation.

In addition, work in cognitive psychology has argued that when choosing actions to achieve a goal, the actions that offer the highest expected utility, based on past experience, will be selected (Lovett and Anderson 1996). As a result, given participants' uncertainty about the utility of the two interfaces for posting an opinion, because of the complete lack of experience with the competing interface, it is less surprising that the incumbent has an equivalent choice share in the two goal conditions. Participants make their choice based on a desire to try something new, and a willingness to accept the risk inherent in trying a novel product. If choice is not driven by habits of use, then the goal-activation manipulation should not affect participants' interface choices. This notion finds further support in the responses to the open-ended question asking participants why they chose the interface that they did. The majority of people who chose the incumbent did so because they felt that they had learned how to use it, while those who chose the competitor were searching for a novel experience. It follows that a stronger test of the importance of goal activation would associate each goal with a specific set of actions rather than simply positing a novel goal. This approach motivates Experiment 3.

Experiment 3

The important role that goals play in the organization and activation of human behavior has been well established (Anderson, 1983; Bargh 1990). In fact, Anderson (1983) argued that all "human behavior acquires its organization through always being controlled by an organized structure of goals." Moreover, Aarts and his colleagues have demonstrated that goals play an important role in activating and directing habitual behavior. Therefore, Experiment 3 was designed to examine the potential for different goals to affect consumer choice between interfaces.

While Aarts and Dijksterhuis (2000a) investigated the effect of activating different goals that had previously been associated with different actions outside of the laboratory environment, Experiment 2 used one goal that had been achieved within the experiment and a second goal that had no association to either interface or any specific actions. In order to accurately assess the relative suitability of each interface for achieving the different goals, it may be critical for the participant to have associated each interface with at least one of the two goals. Additionally, having experience with Interface B should reduce or eliminate the central role that novelty and the willingness to accept risk played in Experiment 2. In doing so, Experiment 3 demonstrates that goal-activation can indeed have an impact on interface choice, and can substantially reduce the effect on choice behavior of the habitual performance that accrues with use of the incumbent interface.

Hypotheses for Experiment 3

I concluded that the lack of an effect of goal activation on interface choice in Experiment 2 might have been due to the presentation of a goal that was not associated with any specific action(s). To remedy this, Experiment 3, will examine the effect of activating a goal that is associated with specific action(s) on consumer choice. Therefore, Experiment 3 tested *revised* versions of H_5 and H_6 from Experiment 2.

$H_{5'}$: Consumers are more likely to try a competing interface when a different usage goal is activated, *and that goal has been associated with the competing interface.*

$H_{6'}$: The effect of practice on the probability of trying a competing interface ($H_{5'}$) is reduced when the consumer's usage goal differs from the goal that was present when the consumer learned to use the interface, *and the different goal has been associated with the competing interface.*

Method & Procedure

Eighty undergraduate psychology students participated in Experiment 3 for course credit. Subjects were randomly assigned to complete either 1 or 9 trials with the incumbent interface given an information search goal (see Experiment 1). Having completed the assigned number of incumbent trials, participants were required to use the competitor interface to post an opinion. Participants were also assigned to one of two goal activation conditions. In the *same* goal activation condition, participants were asked to choose between the incumbent interface and the competing interface to complete one more information search task (i.e., the same goal as in the incumbent trials). In the *different* goal activation condition, participants were asked to choose between the incumbent interface and the competing interface to complete a new and different task (i.e., a different goal from the incumbent trials). The different goal required participants to post their opinion in response to the following question: "Do you agree with the article

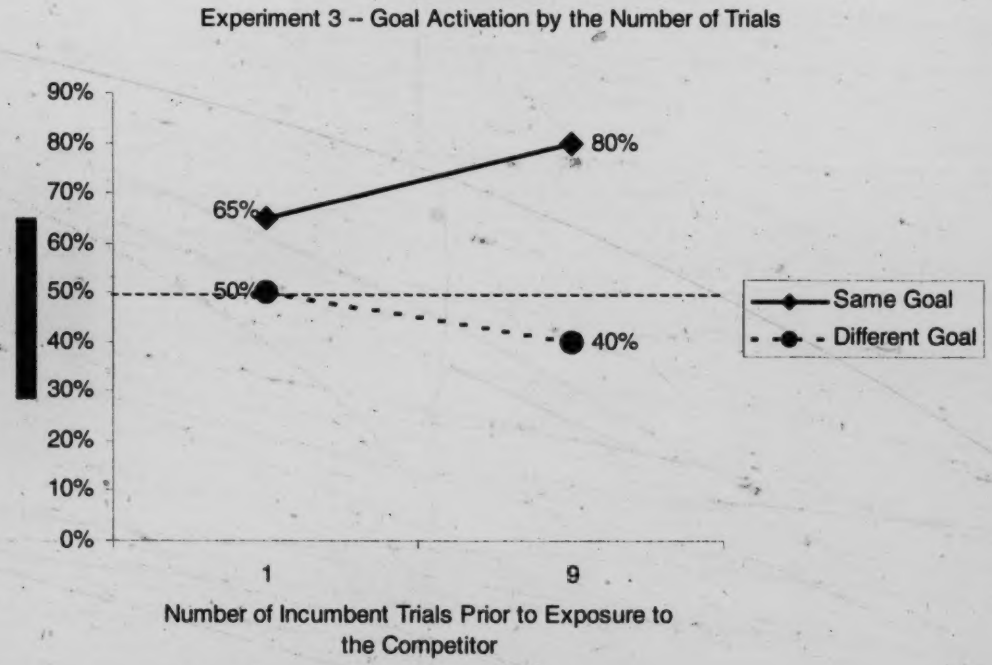
below entitled *Prime Time Gets Real With a Plump Heroine* that there has recently been a move to casting more 'real-sized' women in TV?"

Therefore, the design of the experiment was a 2 (goal activation; same or different) by 2 (number of trials; either 1 or 9). After completing either 1 or 9 information search tasks with *Interface A*, participants were required to use a different interface (*Interface B*) to post their opinion. It is important to note that the difference between this experiment and Experiment 2 is that the participants *were* required to try the alternative before making their choice. Moreover, the alternative interface (*Interface B*) was used to achieve the "different" goal. As a result, participants had information search experience with Interface A, but no experience posting opinions; and, they had opinion posting experience with Interface B, but no information search experience. That is, the different goals were associated with different interfaces. In all conditions, subjects were given the option of continuing on with the incumbent interface or trying the alternative. This manipulation was designed to test H_{5*} and H_{6*}. After completing the final trial, each participant responded to a short survey comprised of manipulation checks and additional rating-scale measures (see Table 6). They were then debriefed and the experiment was complete.

Table 6: Experiment 2 – Post-Experiment Questions

1	Do you have any thoughts as to what might be the research question(s)? (open-ended)
2	Do you have any other comments regarding this study? (open-ended)
3	I liked the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
4	I trusted the interface that I chose to use for the last trial (1 Strongly Disagree to 7 Strongly Agree)
5	I felt there was less risk in using the interface that I chose to use for the last trial. (1 Strongly Disagree to 7 Strongly Agree)
6	I found the site I chose easy to navigate. (1 Strongly Disagree to 7 Strongly Agree)
7	I found Interface A easy to use. (1 Strongly Disagree to 7 Strongly Agree)
8	I would recommend Interface A to others. (1 Strongly Disagree to 7 Strongly Agree)
9	I gained skill at using Interface A. (1 Strongly Disagree to 7 Strongly Agree)
10	How much experience do you have with the internet? (1 No Experience to 7 A Great Deal of Experience)
11	How old are you? (open-ended)
12	What is your gender? (male or female)

Figure 8



Results

The results from Experiment 3 (see Figure 8) indicate that when the *different* goal is activated, the preference for the incumbent is reduced – i.e., when the task goal is not the same as the training goal, the incumbent interface loses choice share. The difference in choice share is magnified as experience with the incumbent increases. As expected, in the same goal condition, the incumbent has a greater market share and the incumbent's market share grows with experience. A logistic regression examining the main effects of goal activation and number of trials, as well as the interaction of these two factors, on choice reveals that goal activation has a significant effect on the incumbent's choice share ($\chi^2 = 6.336$, p-value = 0.012); however, there is no main effect for the number of tasks ($\chi^2 = 0.0556$, p-value = 0.813) and no interaction ($\chi^2 = 1.488$, p-value = 0.222). This provides support for H_{5*}, and but not for H_{6*}.

Although I didn't find any impact of missteps on choice in Experiment 2, the important role that missteps played in Experiment 1 suggests that misstepping might have an impact here as well. The results of a logistic regression with interface choice as the dependent variable and goal activation, number of incumbent trials, missteps, and the relevant interactions as independent variables are provided in Table 7. Although the interaction between incumbent trials and goal condition was not significant in the previous logistic regression, when missteps are included in the model a significant three-way interaction emerges. It is clear from Figure 9 that misstepping has an important impact on the interaction between incumbent trials and goal. For those participants that did not misstep (n = 33), increasing practice has a dramatic effect on choice shares: in the same goal condition the incumbent's choice share is 100%, while in the different goal

condition the incumbent's choice share is 29%. However, for those participants that do misstep (n = 47) the impact of practice is negated and only a main effect for goal condition remains. Therefore, H_{6*} finds support among those participants that do not misstep, but not among those that do misstep.

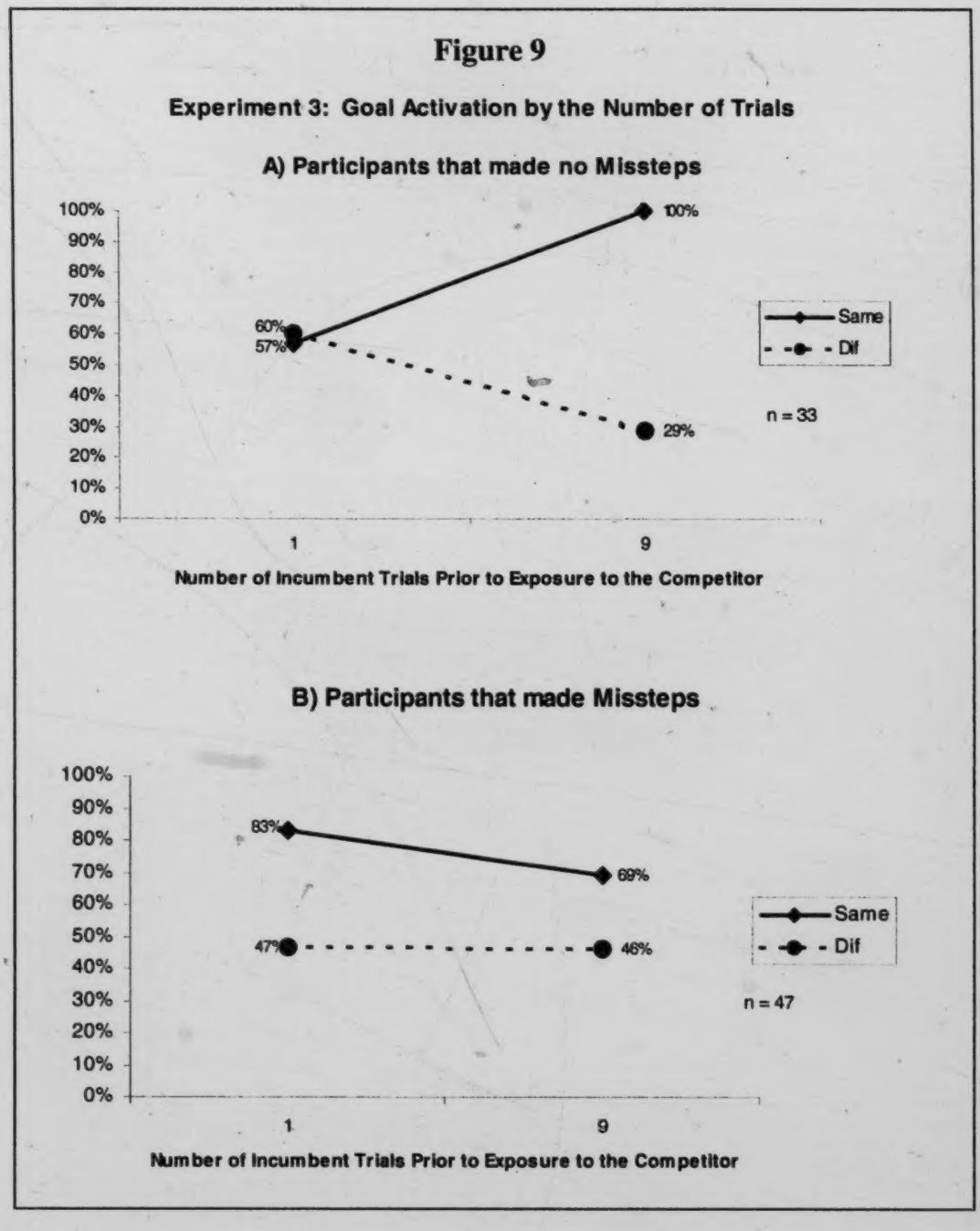
Table 7: Experiment 3 – Logistic Regression Results

	Coefficient Value	χ^2	p-value
Goal Condition	2.250	6.336	0.012
Number of Trials	-1.648	0.056	0.813
Missteps	-1.461	0.082	0.774
Goal Trials*	-2.309	1.406	0.236
*Goal*Missteps*	-1.573	0.0098	0.754
*Trials *Missteps*	1.853	0.446	0.504
Goal Trials *Missteps*	2.504	5.658	0.017

When the rating-scale questions (see Table 6) are included in a logistic regression as independent variables with interface choice as the dependent variable, only Questions 7 ("I found Interface A easy to use," $\chi^2 = 28.924$, p-value < 0.0001) and 8 ("I would recommend Interface A to others," $\chi^2 = 10.527$, p-value = 0.001) have a significant effect on choice. All other questions did not have a significant impact at conventional levels (all have $p > 0.25$). Those participants that chose Interface A averaged a rating of 8.213 on Question 7, while those participants that chose Interface B averaged a rating of 5.212. These ratings are significantly different (ANOVA $F(1,78) = 36.662$, $p < 0.0001$). Those participants that chose Interface A averaged a rating of 7.723 on Question 8, while those participants that chose Interface B averaged a rating of 3.939. These ratings are also significantly different (ANOVA $F(1,78) = 55.339$, $p < 0.0001$). Rating responses to Question 9 ("I gained skill at using Interface A") did not have a significant impact on

Figure 9

Experiment 3: Goal Activation by the Number of Trials



choice (M = 7.667, 7.340, χ^2 = 0.496, p-value = 0.404). Consistent with the findings in Experiment 1, these results suggest that the ease of using the incumbent is an important determinant of the interface choices that participants make, but participants are not aware that acquired skill per se is influencing their interface choice.

Discussion

The results of the third experiment demonstrate that goals do play an important role in the activation of habitual behavior. Moreover, with an increasing number of incumbent trials (i.e., as the navigation behavior becomes increasing automated) goal-activation has an increasing effect on choice behavior. In fact, when the post your opinion goal is activated, participants who have had 9 trials with the incumbent interface show a preference for the competitor, although when the information search goal is activated participants who have had 9 incumbent trials display a strong preference for the incumbent. This effect is accentuated for those that have not misstepped during the incumbent trials. The only difference between these two conditions is the goal that is activated when participants are asked to make a choice.

The results of Experiment 3, in combination with the results of Experiment 1, clearly indicate that the observed navigation behaviour is consistent with the definition of a skill-based habit. Experiment 1 demonstrates that with practice participants are able to complete the navigation task in an automated fashion. The speed of task performance reaches an asymptote and the standard deviation across subjects is dramatically decreased. While the navigation behavior is not automated to the same extent that breathing is, nor is it habitual by the behaviorist definition in the same way that a rabbit habitually blinks after a gust of air, it is automated in the sense that the task completion

time has reached an asymptote along the learning curve (Logan 1988). In addition, goal-activation clearly plays an important role. Therefore, the behavior observed in the first and third experiments does satisfy the definition of habits as goal-activated and automated behavior.

To test for the possibility of a demand effect I asked all participants at the conclusion of the experiment what they thought this study was investigating and what research questions they thought we might be investigating. None of the participants guessed the nature of the underlying hypotheses. In addition, I randomly selected 4 participants and conducted an in-depth post-experiment interview lasting approximately 5 minutes, during which I questioned them about their thoughts on the research questions that this study might be addressing. All 4 of these participants assumed that the study was examining interface choice and the two participants in the 9 incumbent trial conditions assumed familiarity was being studied (given the repetitive incumbent trials); however, none of the 4 mentioned goals or the effect that different goals (or task instructions) might have on interface choice.

General Discussion

The first three experiments provide compelling evidence that consumption habits affect consumer choice behavior. Habitual use of an incumbent computer interface reduces the time required to accomplish specific consumption goals. In turn, the reduction in task completion time reduces the relative attractiveness of competing interfaces to which the habitual behavior does not easily transfer. The *Relative Task Completion Time* (RTCT) metric is a measure of the human capital that has accrued to the incumbent relative to the competitor. The results of the first experiment demonstrate

that the RTCT completely mediates the impact of the number of incumbent trials on consumer choice. Moreover, some of the traditional alternative antecedents of consumer loyalty such as an affective attachment or high levels of trust do not appear to play a role in people's interface choices.

However, because habit is goal-specific, learning to use one interface to habitually accomplish a specific goal does not lead to a preference for that interface when another goal (that has been associated with a different product) is activated. Nevertheless, the incumbent does have an advantage when the activated goal is not associated with any particular product or set of actions (this advantage appears to be reduced by the individual's desire to try something new). In combination, these three experiments link the idea that habits can be conceptualized as goal-activated automated behavior to the human capital theory of consumer behavior. As such, habitual consumption is an example of a type of human capital that results in consumer behavior that is consistent with the basic predictions of the human capital models (Ratchford 2001; Wernerfelt 1985). Specifically, the skill-based habits that are investigated in the first three experiments demonstrate that, when human capital accrues in favour of an incumbent product, that product has an advantage over competitors in the marketplace.

Given the conservative nature of the radio button versus pull-down menu manipulation, these three experiments are powerful demonstrations of the ability of relatively small product differences to result in meaningful differences in human capital that can lead to a significant market share advantage for the incumbent. The next chapter goes beyond the fundamental "practice makes preference" hypothesis and tests important

additional predictions with respect to consumer loyalty that can be derived from the human capital models.

CHAPTER 3: THE MODERATORS

Experience does not err; only your judgements err by expecting from her what is not in her power.
Leonardo Da Vinci

The Moderators

Experiments 1 and 3 demonstrate that skill-based habits of use can affect consumers' choice behaviour. As the number of times the consumer uses the incumbent interface to accomplish a specific goal increases, so does the consumer's preference for that interface, given the same type of goal. When a different goal is activated – a goal that is associated with a different interface – the incumbent's advantage is extinguished. In fact, for those consumers that do not misstep, the activation of a different goal not only eliminates the incumbent's market share advantage, it results in a dominant market share for the competitor (i.e., the interface with which achieving the "different" goal is associated). Taken together, these experiments provide strong evidence of the important role that skill-based habits of use can play in consumer choice.

Furthermore, Experiment 1 demonstrated that the development of a preference for the incumbent with additional task experience is completely mediated by the ability of the consumer to transfer from the incumbent to the competitor. The easier it is to transfer from using the incumbent to using the competitor to complete the same type of task, the more likely the consumer is to choose the competitor. The mediating role of RTCT in consumer decision making is in line with the theory and the hypotheses described in the first two chapters. The powerful effect that missteps have on the development of habits

of use – i.e., impeding the learning process – was more surprising. Given the nature of the task, participants were only allowed to take one "step" off of the correct path before they were pointed back in the right direction; and yet, whether or not they stepped off the correct path was a powerful predictor of which interface they subsequently chose. This finding is particularly relevant to understanding an apparent disparity between the predictions of the human capital model, and recent findings on the importance of ease of use in the development of interface loyalty. Experiment 4 further examines the moderating role of misstepping within the theoretically important context of task complexity.

The final study, Experiment 5, is designed to broaden our understanding of the impact that accumulated human capital can have on consumer choice behaviour. While the first 4 experiments are focused on the development of habits of use and the effect that such habits have on choice, Experiment 5 digs deeper into the consumer behaviour predictions of the human capital model and demonstrates that, although time pressure and brand-specific training have an impact on consumer choice, that impact is not in the direction predicted by the HC models. In addition, Experiment 5 extends the findings of the first 4 experiments by demonstrating that experience with an incumbent can lead to a preference for that incumbent over a competitor that was considered superior prior to experience with either interface (as opposed to the objectively equivalent competitor that has been used in experiments 1 to 4). Combined, Experiments 4 and 5 reveal that the strength of the loyalty evident in the first 3 experiments can be moderated by factors that are common to many consumption experiences. These studies also indicate that attempting to create lock-in by pressuring consumers or constraining consumer choice

can, in fact, weaken the desired response. It appears that making a product easier to use through experience or through product simplification, and allowing consumers to choose freely, can lead to a significant competitive advantage.

Experiment 4

Experiment 4 was designed to address an apparent disparity between the human capital models (Ratchford 2001; Wernerfelt 1985) and recent empirical evidence with regards to the role of task complexity in consumer learning and choice. The HC models argue that training results in the accumulation of knowledge and skill, and that the more brand-specific knowledge or skill that is accumulated, the more locked-in consumers will be to that particular brand. This position has intuitive appeal, the more skilled one becomes at finding information on a news site, the more useful that site is, and the larger its advantage becomes over its competitors. We have seen some evidence of this in the results of Experiment 1. Taken a step further, if more learning leads to more lock-in, then products that require greater brand-specific skill to use should also lead to higher levels of loyalty (Alba and Hutchinson 1987). Such products offer more to the consumer who invests in learning how to use them – i.e., relative to equally complex alternatives the incumbent should have a much larger advantage. In other words, the more time that can be saved in the future by investing in skill-acquisition today, the more worthwhile it is to make the required investment.

On the other hand, given the important moderating effect that difficulty in using the product (e.g., misstepping) has on subsequent interface choice, it may also be the case that all else being equal, more learning results in a higher probability of switching away from the incumbent. The findings of Johnson et al. (2003) provide some support for this

supposition. Their results indicate that web sites with faster learning curves – i.e., the web sites that users were able to learn to use more rapidly – had higher levels of purchasing. The results of Experiment 1 (above) suggest one reason that an advantage might accrue to web sites that are easier to use, even though less learning is required to successfully use them (i.e., less human capital is acquired): web sites that are easier to use are less likely to result in consumer missteps. On the other hand, more complex sites may increase the probability that a user will misstep and, as a result, the user is more likely to chose a competitor. Experiment 4 looks at the interplay between site complexity, misstepping and RTCT, in an attempt to better understand the drivers of the type of loyalty being investigated in this dissertation. Two sets of hypotheses are presented below, one based on the predictions of the human capital models, and the other reflecting the alternative predictions based on the importance of ease of use.

Hypotheses for Experiment 4 – Human Capital and Task Complexity

It has been recognized for some time that as task complexity increases, decision makers rely more and more on simplifying heuristics (Payne, Bettman and Johnson 1993). These include attempts to accelerate processing (Ben Zur and Breznitz 1981), filtering of information down to the most important elements (Miller 1960), and increasing in the use of noncompensatory strategies such as elimination by aspects (Tversky 1972) and lexicographic strategies (Wright 1974; Zakay 1985). Habitual responses are another effective means of dealing with task complexity, in part because the amount of information processing required is greatly reduced (Haider and Frensch 1996).

Campbell's (1988) review of the task complexity literature highlights an important distinction between objective task complexity and subjective task complexity. Objective task complexity can be determined by a variety of factors, including the number of alternatives, the number of attributes, the number of possible end-states, the constraints that need to be satisfied, and the number of path-goal connections. Subjective task complexity is affected by other factors, including a person's experience with the task, availability of tools, time pressure, and individual cognitive factors (attention span, short-term memory, computational efficiency, etc.). In other words, the complexity of an interface is only partly determined by the actual design and use of the interface itself. It is also affected by some of the other factors already discussed, such as an individual's time value, the amount of experience (i.e., practice) they have had with the interface, and the availability of simplifying tools (such as Amazon's "one-click" technology).

To the extent that consumer lock-in is determined by switching costs based on accumulated human capital, web sites that are extremely easy to use – and therefore, require little skill acquisition – should result in lower levels of consumer loyalty. As a consequence, web sites that are very easy to use and require little skill acquisition are unlikely to develop deep buyer lock-in. For lock-in to occur, some amount of human capital must be accumulated. In addition, some of the skills have to be non-transferable, and practice has to result in a meaningful reduction in the time required to complete the task. Therefore, the web site's complexity of use is an important factor in the development of buyer lock-in, such that:

H_7: Objective task complexity decreases the probability of switching to a competing interface in the future.

H_8: The effect of complexity on the probability of switching (H_7) increases with increasing practice.

Hypotheses for Experiment 4 – Task Complexity and Ease of Use

Amazon's adamant defence of their "one-click" technology is indicative of their belief that the ability to simplify the lives of their customers is central to their continued market leadership. We have seen additional evidence from both academics (Bellman et al. 1999) and consultants (Forsyth, Lavoie and McGuire 2000) that support the desire for simplicity and ease of use among internet users. Similarly, Zauberman's (2003) set-up versus evaluation costs framework argues that consumers will choose the easier initial alternative (lower set-up costs), and pay less attention to the long-term consequences (higher evaluation costs) of failing to invest more early on.

It is also apparent from the results of Experiment 1 that missteps reduce the speed with which participants learn to complete the task. As a result, if greater complexity results in more usage errors then greater complexity may also reduce the amount of human capital that participants acquire within the allotted trials. If this is the case, increasing complexity should slow down the development of preference in such a way that more trials are required to reach the same market share as a product that is objectively less complex a priori. This perspective leads to an alternative set of hypotheses that reflect a pattern of results for Experiment 4 that is in contrast to the predictions of the HC model:

$H_{7'}$: Objective task complexity *increases* the probability of switching to a competing interface in the future.

$H_{8'}$: The effect of complexity on the probability of switching *decreases* with increasing practice.

Method & Procedure

Eighty-eight undergraduate psychology students participated in Experiment 4 for course credit. Experiment 4 examined the impact of task complexity on interface lock-in. As in Experiment 1, participants were required to complete an information search task. Each respondent was randomly assigned to complete either 1 or 9 trials, in one of two task complexity conditions. Task complexity was either high or low, and it was manipulated by changing the number of web pages that must be navigated through before the target information can be found. In the low condition participants had to navigate through 2 web pages and in the high condition they had to navigate through 6 web pages. Therefore the design of this experiment was a 2 (number of incumbent trials) by 2 (complexity) between subjects design. The incumbent interface was *Interface A* and the competing interface was *Interface B*. After completing the assigned number of trials with *Interface A*, all participants were required to complete an additional trial using *Interface B*, which required them to navigate through the same number of web pages as the previous trials to successfully complete the task. After the competitor trial, participants were asked to choose between the two interfaces, to complete a final trial, and to indicate the extent of their preference for the interface that they had chosen. The respondent was then required to complete a final trial using the interface they had chosen. After completing the final trial, each participant responded to a short survey comprised of manipulation checks and additional rating-scale measures (see Appendix B). They were then debriefed and the experiment was complete. Experiment 4 was designed to test hypotheses H_7 and H_8, as well as H_{7*} and H_{8*}.

Results

H_7, H_8, H_{7*} and H_{8*} can be tested simultaneously using a logistic regression with interface choice as the dependent variable and independent variables for complexity, number of incumbent trials, and the interaction between complexity and the number of incumbent trials. The results of the regression indicate that only the coefficient for complexity is significant ($\chi^2 = 4.078$, p-value = 0.043). The number of incumbent trials does not have a significant effect on choice share ($\chi^2 = 0.470$, p-value = 0.492), and the interaction is also not significant ($\chi^2 = 1.126$, p-value = 0.289). The direction of the complexity effect supports H_{7*} and does *not* support H_7 (Figure 10). In addition, while the interaction is not significant, follow-up tests indicate that there is a significant effect of number of tasks in the high complexity condition, but not in the low complexity condition – which supports the alternative hypothesis (H_{8*}), but *not* H_8. In the low complexity condition, Fisher's exact Chi-Square test of the choice shares by number of incumbent trials produces a p-value of 0.2115. In the high complexity condition Fisher's exact Chi-Square test of the choice shares by number of incumbent trials produces a p-value of 0.0017. Although the low complexity choice shares are lower in task 9 than in task 1, suggesting a decrease in preference with additional incumbent trials, this difference is not significant, and an examination of the extent-of-preference measures indicates that the decrease may be a result of weak preferences (Figure 11). I formally test this possibility below.

Figure 10

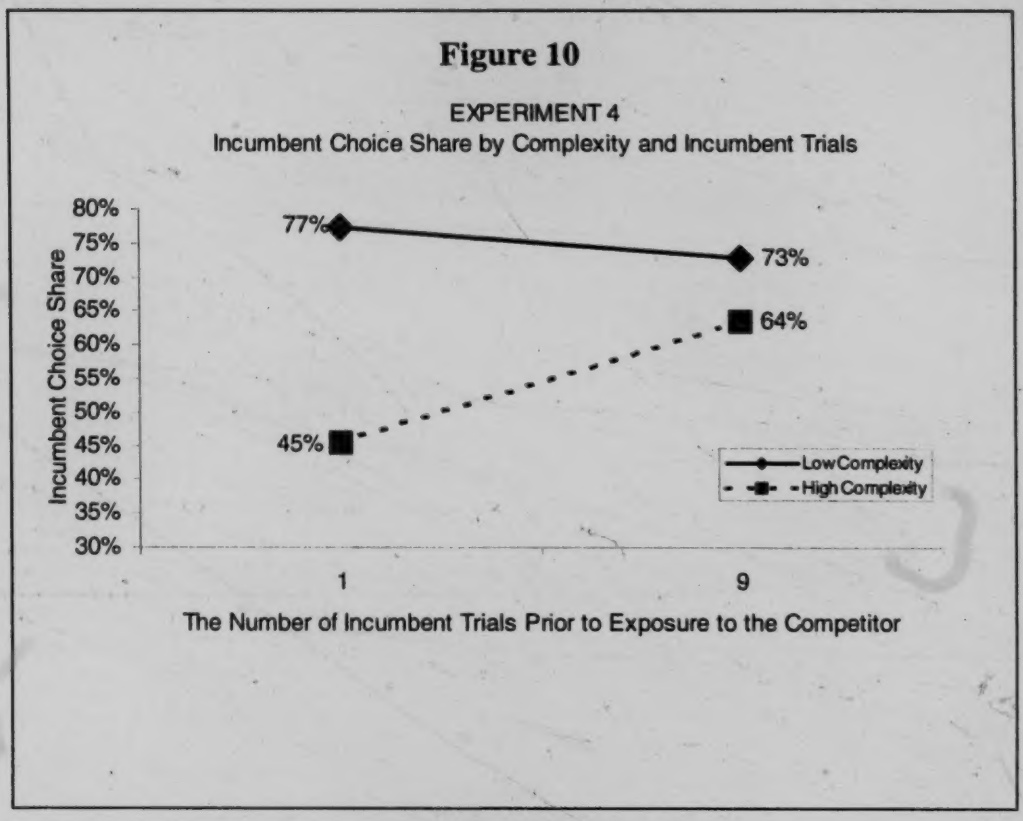
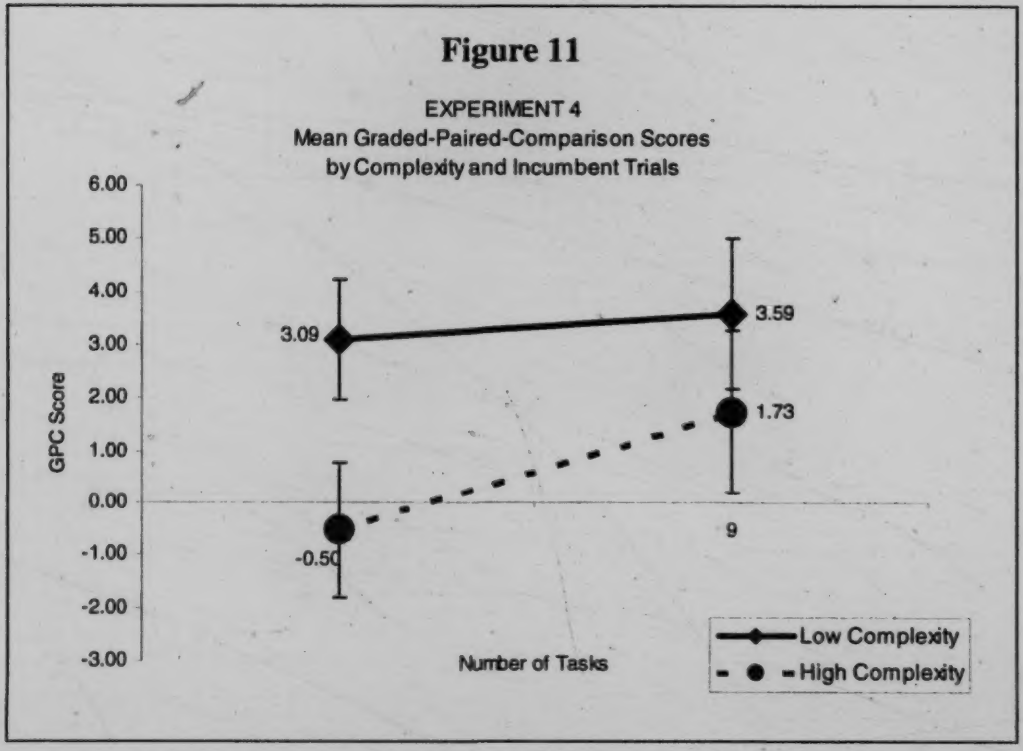


Figure 11



Given the important mediating role played by RTCT in Experiment 1, it is reasonable to suspect that RTCT is an important predictor of interface choice in this experiment as well. I test this prediction using a logistic regression model with interface choice as the dependent variable and RTCT as the independent variable. However, the results indicate that RTCT is not a significant predictor of choice here ($\chi^2 = 2.190$, p-value = .139). When incumbent trials, complexity, RTCT and their interactions are included in the same model, only the coefficients for complexity ($\chi^2 = 4.078$, p-value = 0.043) and complexity *RTCT ($\chi^2 = 7.894$, p-value = 0.005) are significantly different from zero. Given the above finding that incumbent trials only has an effect in the high complexity condition, it is not surprising to find that RTCT only has an effect in the high complexity condition as well – based on a logistic regression with interface choice as the dependent variable and RTCT as the independent variable on the high complexity subset of the data ($\chi^2 = 7.550$, p-value = 0.006). As I suggested with regards to the impact of incumbent trials on choice, the fact that RTCT is predictive of choice in the high complexity condition and not predictive of choice overall may reflect the lack of preference information in the raw choice responses. I now turn to testing this possibility.

The bi-modality of the distribution of the extent-of-preference measures does not make the -10 to +10 GPC scale amenable to traditional statistical analyses[8]. However, by collapsing the scale to a -3 to +3 GPC scale[9], the distribution is approximately normal and the data can be analyzed with an ordinal logit model, which includes strength of preference as well as choice information in the dependent variable. This allows a formal

[8] Kolmogorov-Smirnov Goodness-Of-Fit test strongly rejects the assumption of normality (Fit Stat = .261, df = 88, $p < 0.0001$) for the –10 to +10 GPC data.

[9] Scores in the range of –10 to –7 were collapsed to –3, -6 to –5 were collapsed to –2, -4 to –1 were collapsed to –1, 1 to 4 were collapsed to 1, 5 to 6 were collapsed to 2, and 7 to 10 were collapsed to 3.

test of the supposition that weak preferences within the 1 incumbent trial/low complexity condition are contributing to the lack of an effect of incumbent trials and/or RTCT. This model indicates that RTCT does have a significant effect on choice in all conditions (Wald Z = -2.060, p-value = 0.040). When the same ordinal logit model is employed with complexity, incumbent trials and their interaction as dependent variables, complexity remains significant (M = 1.273, 0.273, Wald Z = -1.960, p-value = 0.049), incumbent trials is marginally significant (M = 1.023, 0.523, Wald Z = -1.840, p-value = 0.066) and the interaction is not significant (Wald Z = 0.250, p-value = 0.804; Cell Means: Low Complexity/1 Trial = 1.182, Low Complexity/9 Trials = 1.363, High Complexity/1 Trial = -0.136, High Complexity/9 Trials = 0.682).

Having tested the formal hypotheses, it is interesting to look at the effect of complexity on the probability of misstepping, as well as the impact of misstepping on interface choice. Collapsed across incumbent trials, 38.6% of participants misstepped during their incumbent trails in the high complexity condition, while in the low complexity condition only 18.2% of participants misstepped. When the number of incumbent trials is taken into account, the probability of misstepping is 18.2% (4 out of 22 participants misstep) in both 1 incumbent trial conditions as well as in the 9-incumbent trials/low complexity condition. However, in the 9 incumbent trials/high complexity condition 59.1% (13 out of 22) of participants misstepped. An ANOVA indicates that both main effects are significant (incumbent trials: F(1,84) = 8.118, p-value = 0.006; complexity: F(1,84) = 8.118, p-value = 0.006), as is the interaction (F(1,84) = 5.435, p-value = 0.022). The main effects indicate that, as the interface becomes more complex and the number of incumbent trials increases, the probability of misstepping

also increases. However, it is apparent from the interaction that, in fact, the increase in misstepping occurs only when complexity is high *and* nine incumbent trials have been completed.

To test the impact of misstepping on interface choice, a logistic regression with choice as the dependent variable and missteps as the independent variable is used. The results indicate that misstepping does have a significant impact on interface choice (χ^2 = 4.197, p-value = 0.040). The results indicate that when missteps are made, participants are significantly more likely to choose the competitor, the probability of choosing the incumbent falls from 0.698 to 0.520. Given the theory laid out so far, it is reasonable to suspect that the impact of complexity on choice is, in fact, mediated by whether or not the participant misstepped during the incumbent trails. To test for this form of mediation, I use the 4-step Baron and Kenny procedure (1986; see also, Judd and Kenny, 1981). The first step of the procedure establishes that there is an effect that may be mediated by examining the correlation between the initial variable (complexity) and the outcome variable (interface choice). This is done using a logistic regression with complexity as the independent variable and choice as the dependent variable. The results indicate an effect of complexity on interface choice (χ^2 = 4.078, p-value = 0.043). The second step is to demonstrate that the initial variable (complexity) affects the mediator (missteps), which is accomplished using an OLS regression with complexity as the independent variable and missteps as the dependent variable. The results replicate the ANOVA results above: complexity does have an effect on the probability of misstepping (F(1,86) = 7.157), p-value = 0.009).

The third step is to demonstrate that the mediator (misstep) affects the outcome variable (interface choice), while controlling for the impact of the initial variable (complexity). Complete mediation is established if the effect of Complexity on interface choice is not different from zero when missteps are included in the model (the fourth step). A logistic regression was used to test for complete mediation with complexity and missteps as the independent variables, and interface choice as the dependent variable. Complete mediation is established as misstep has a significant effect on interface choice ($\chi^2 = 4.197$, p-value = 0.040) and the effect of the complexity on interface choice is not significantly different from zero in this model ($\chi^2 = 2.627$, p-value = 0.105).

Discussion

Experiment 4 demonstrates that although more complex interfaces can lock users in given sufficient experience with the incumbent before using a competitor, interfaces that are low in complexity – and, hence, easy to use – can lock consumers in much more quickly. In addition, it is clear from the results that higher complexity does not necessarily lead to greater lock-in, as even with 9 incumbent trials the incumbent market share in the high complexity condition did not surpass the incumbent market share in the low complexity conditions. The data indicate that with a complex interface users are more likely to make errors (i.e., misstep), and, as a result, choose the competitor. Moreover, while RTCT is predictive of consumer choice, the probability of making a usage error has a stronger impact on which interface the consumer chooses. Therefore, it does not appear that more complex products are more likely to lock consumers in. While we know that skill transferability plays an important role in this type of loyalty (Murray and Häubl 2002), it appears that a small amount of non-transferable skill can go a long

way towards locking consumers in to an incumbent product. Although more complex products suffer from being more difficult to use, which in turn increases the probability of switching, an interesting extension of the findings from Experiment 4 would consider the value of more supervised training (as opposed to the learning-by-doing approach used here) in learning to use complex products and becoming loyal to them. It is possible that training, which helped to minimize mistakes during the learning process, would result in faster learning curves and greater amounts of human capital being accumulated more rapidly, as compared to learning-by-doing. As a result, product users might become more loyal, and the incumbent might enjoy a larger market share, than is possible if the consumer is left to learn by doing and exposed to a much higher probability of making mistakes that slow the learning process down.

Experiment 5

Unlike the previous four experiments, Experiment 5 is not interested in differences that arise as a result of different amounts of practice. Instead, this experiment focuses on the impact of additional moderating variables – the consumers' time value and brand-specific training – that Ratchford (2001) and others (e.g., Wernerfelt, 1985) have predicted should play an important role in development of the type of loyalty being examined in this dissertation.

Time value has been cited as a critical factor in determining consumers' susceptibility to becoming locked-in as a result of human capital acquisition (e.g., Cialdini 2001). The idea is that people who place a higher value on their time gain more from the reductions in task completion time that accrue with practice, as compared to those who place a lower value on their time. Therefore, consumers with higher time

values should find the human capital that they gain as a result of using a product to be more valuable then consumers who place a lower value on their time. Consequently, these consumers' are less likely to switch to competing products after having acquired skill that is specific to an incumbent.

Brand-specific training is thought to have a similar effect (Wernerfelt 1985). When a consumer has acquired human capital that is specific to only one brand (product or service), the preference for that brand should be stronger than it would be if the acquired skills were generalized across more than one brand. Experiment 5 examines the impact of these two potential moderators, and discusses the role that psychological reactance can play in limiting a firm's ability to increase this type of loyalty by constraining consumer choice.

Hypotheses for Experiment 5

As previously discussed, when human capital accrues to a particular brand, the subjective value of that brand increases relative to other brands in the marketplace. As a result, with greater use, the probability of switching decreases, and the objective difference in functionality (i.e., quality, price, usability, etc.) necessary to entice a consumer to switch brands increases (Wernerfelt 1985). This means that although two brands may be initially equivalent, practice with one brand that results in the accumulation of brand-specific knowledge and skill will create a preference for the experienced brand. Taken a step further, even when one brand is objectively superior to another brand, prior to experience with either brand, the inferior brand can come to be preferred if enough human capital specific to the inferior brand is accumulated. Therefore,

H_9: Accumulated human capital can make an initially objectively inferior brand preferred.

The First-Mover Advantage and Control over Learning

The advantages and disadvantages of being a first-mover are well established, and it is clear that facilitating the development of switching costs can play a pivotal role in a firm's ability to capitalize on being first into a market (Hamel 2001; Lieberman and Montgomery 1988). Because buyers make choices under uncertainty (i.e. without complete information) and previous success plays an important role in future decision making, late entrant firms will have to invest considerable resources to switch buyers over from first-mover firms (Shapiro and Varian 1999). From this perspective, the key to securing a first-mover advantage, that cannot be easily imitated or overcome, is to train consumers before they are exposed to any competing alternatives (Carpenter and Nakamoto 1988; Ries and Trout 1981).

From a learning perspective, the first-mover advantage can be conceptualized as the consumer's control over learning. When a firm launches a new product or service before its competitors, consumers wishing to use that product or service must buy from the first-mover firm. They are forced to learn to use that firm's product or service before they have an opportunity to experience any competing offerings. In an internet setting, and given the powerful impact that practice can have on the subjective value of the first-mover's interface relative to late entrant competitors, the potential clearly exists to lock-in those consumers who have no control over which interface they learn to use – i.e., if they are going to access the first mover's product or service, they must use their interface. This type of *constrained learning* is an important contributor to lock-in, because it results in repeated brand-specific practice. Consequemtly, the first-mover has the opportunity to

lock its customers in before they have the opportunity to consider alternatives. On the other hand, when a consumer initially uses a number of different interfaces to buy the same product or service, they are experiencing a more *free* type of learning that is not brand-specific and is unlikely to result in lock-in to any particular brand. Therefore,

H_{10}: The probability of switching to a competing interface is lower after constrained learning than it is after free learning.

The Impact of Time Pressure

The rise of modern automaticity is the result of the time pressure that the majority of consumers find themselves under (Cialdini 2001). We have seen evidence of the importance of simplification (Forsyth, Lavoie and McGuire 2000), and of timesavings as a benefit to online shoppers (Bellman et al. 1999). Savings in terms of time is a key benefit of repeated use, as indicated by the power law of practice. In addition, recent theories based on the notion of human capital argue that one of the key components of a consumer's tendency to repeat prior behaviour is the value that they place on their time (Ratchford 2001). Overall, it appears that the value that a consumer places on his/her time is a direct determinant of how susceptible they are to being locked-in as a result of practice and skill acquisition. Therefore,

H_{11}: Greater time pressure reduces the likelihood of switching to a competitor.

When a consumer places a high value on his/her time, economic theory predicts that they will be more forward looking and will plan their current behaviour in a way that reduces the future time cost of accomplishing the same goal (Ratchford 2001). This suggests that even when internet consumers are buying in markets that offer the opportunity for free learning, they are more likely to primarily use one interface and

accumulate brand-specific skill in return for faster consumption if they are under time pressure. In other words, when time pressure is high, consumers under conditions of free learning will be more focused in their interface use. As a result, they will make fewer transitions (i.e., they will switch less) between available interfaces when learning to complete a consumption task. Therefore,

H_{12}: Under conditions of free learning, an increase in time pressure reduces the number of transitions participants make between alternative interfaces.

H_{13}: The effect of time pressure on the probability of switching (H_{11}) is stronger under conditions of free learning than under conditions of forced learning.

Method & Procedure

Eighty-two respondents were recruited from a student email list to participate in Experiment 5 for compensation. The amount of the compensation ranged from $15 to $25 and depended on the condition that they were assigned to and their performance on the task (see below).

Experiment 5 examined the impact of time pressure and consumer control over learning on interface lock-in. In addition, the strength of participants' lock-in was tested by the presentation of a competing interface (*Interface C*) that was superior (based on the pre-tests reported above) to either of the incumbent interfaces (*Interfaces A* and *B*). In this experiment all participants completed 9 information search tasks. Subjects were randomly assigned to one of four conditions in a 2 (time pressure) by 2 (control over learning) full-factorial design. Time pressure was either high or low. Those in the low time pressure condition were provided with no incentive (beyond any naturally existing incentives) to complete the experiment quickly, and they were paid a flat rate for their participation ($20). Those in the high time pressure condition were paid based on how

quickly they completed the information search tasks. Faster participants were paid more than slower ones[10], thereby adding time pressure to the task. On average, those in the high time pressure condition received $21.30.

Training was either *constrained* to be brand specific, or participants were *free* to choose the brand that they used for each of the first 9 incumbent trials. In the constrained training condition all 9 tasks were completed with the same incumbent interface (*Interface A*). In the free training condition, participants were free to chose, before each incumbent trial, which of the two interfaces (*Interface A* or *Interface B*) they would prefer to use for that trial. The level of task complexity was set at *low* to minimize the influence that misstepping would have on the results (see Experiment 4).

After having completed the initial 9 trials, all participants were required to complete a 10th trial. On the 10th trial, all subjects completed another information search task with a new competitor interface (*Interface C*) – i.e., an interface that they had not seen before. *Interface C* was non-functionally different (hyperlinks rather than radio buttons or pull-down menus) *and* functionally superior (based on the pre-tests reported above). After the 10th trial, participants were asked to choose between the incumbent and the competing interface, and indicate the extent of their preference for the interface that they have chosen. For the subjects in the free learning condition the incumbent was defined as the interface that they used most frequently (i.e., that had the greatest "market share") during the previous nine trials. The respondent was then required to complete a

[10] The payment formula was based on a minimum payment of $10 and a maximum of $25. For every complete minute over 15 minutes that participants took to complete all the assigned tasks (i.e., to complete the final trial with the interface of their choice) $1 was subtracted from the maximum of $25. For example, a participant who required 18 minutes to complete the task was paid $22 (18 minutes – 15 minutes = 3 minutes = $3; $25 - $3 = $22). If participants completed the task in 20 minutes (approximate average time for task completion in previous experiments), they would be paid $20 (the same as the low time pressure condition).

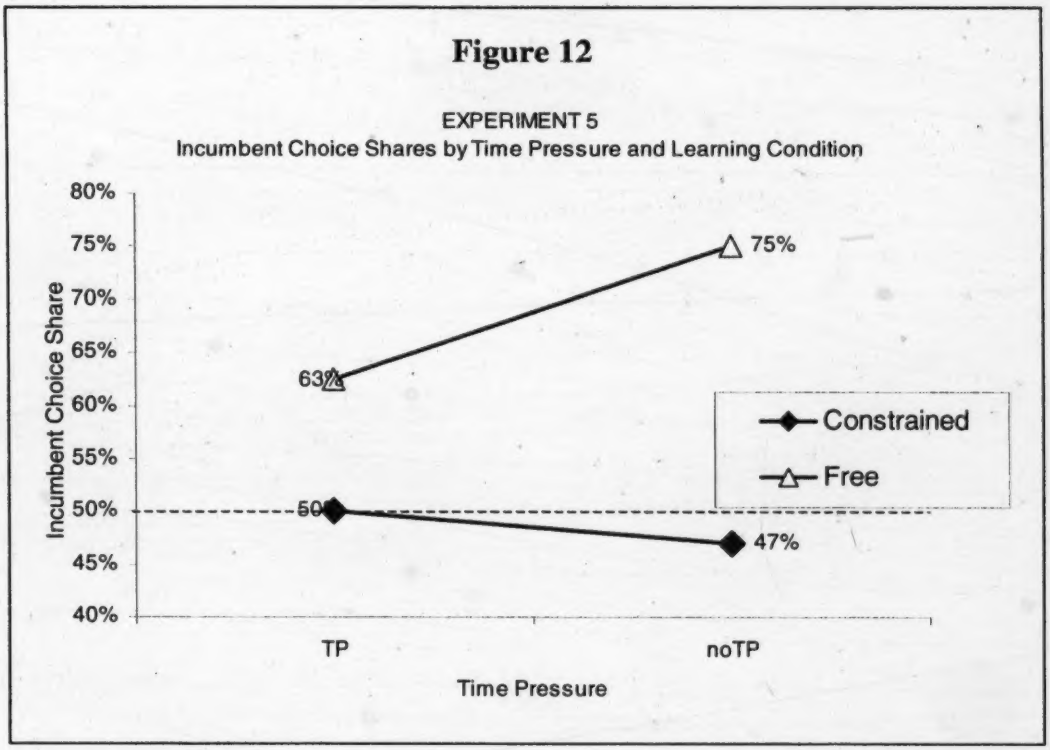
final trial using the interface they had chosen. After completing the final trial, each participant responded to a short survey comprised of manipulation checks and additional rating-scale measures (see Appendix B). They were then debriefed and the experiment was complete. Experiment 5 was designed to test hypotheses 9 through 13.

Results

Hypothesis 9 predicts that an inferior brand could come to be preferred over a superior brand when the participant had acquired sufficient human capital relevant to the inferior brand. Collapsed across all four conditions, the choice share for the inferior incumbent is 62.0%, when choosing an interface for the final trial – 57 of 92 participants chose the incumbent. Based on a binomial test of an equal choice share (50%) between the incumbent and the competitor, the incumbent (judged in pre-tests to be inferior on a number of dimensions) has a significantly larger share (p-value = 0.028). However, while the overall choice share favours the incumbent there are important differences by condition (see Figure 12).

In the constrained learning conditions, there is no deviation from equal choice shares (binomial test of equal choice shares: constrained and time pressure condition, p-value = 1; constrained and no time pressure, p-value = 0.6173). In the free learning condition, the incumbent has a choice share that is significantly greater than 50% in the no-time-pressure condition (binomial test of equal choice shares: p-value = 0.041), but not in the time-pressure conditions (binomial test of equal choice shares: p-value = 0.308). As a result, the data support H_9; however, the experimental treatments do appear to have an impact on the size of the incumbent's choice share.

Figure 12



It is clear from Figure 12 that Hypotheses 10, 11 and 13 are not supported by the data. The differences apparent in Figure 12 are tested using a logistic regression with interface choice as the dependent variable and independent variables representing the two experimental conditions (time pressure and learning condition) and the interaction (learning condition*time pressure). The learning condition (constrained vs. free) had a marginally significant impact on choice ($\chi^2 = 3.678$, $p = 0.055$), the effect of time pressure on choice was not significant ($\chi^2 = 1.118$, $p = 0.290$), and the interaction was also insignificant ($\chi^2 = 0.038$, $p = 0.845$). However, further investigation indicates that 4 of the participants who were under time pressure in the free learning condition made an

inordinate number of mistakes[11] – i.e., each of them made more than 10 missteps as compared to the average of 1.3 missteps. I reran the logistic regression; this time including a dummy coded independent variable to control for these *Bad Misses*, and the interactions among all three independent variables. The results illustrate a strong effect of *Bad Misses* ($\chi^2 = 7.329$, $p = 0.007$) and a significant effect for learning condition ($\chi^2 = 4.990$, $p = 0.025$). However, time pressure and all of the interactions remain insignificant ($p > 0.600$). Therefore, H_{10}, H_{11} and H_{13} are not supported.

Hypothesis 12 predicts that time pressure will result in fewer transitions between the alternative incumbent interfaces under conditions of free learning, as compared to constrained learning. The mean number of transitions under time pressure was 3.476 and 2.720 under no time pressure. Although the means are in the expected direction, this difference is not significant, based on a Kruskal-Wallis rank sum test (K-W chi-square = 1.1471, df = 1, p-value = 0.2842). Therefore, H_{12} is also not supported.

The lack of an effect of time pressure on choice and transitions calls into question the effectiveness of this manipulation. To test whether or not the manipulation was successful, I examine the navigation task completion times between the time pressure and the no time pressure conditions. If the manipulation worked then we should see significantly faster performance times in the time pressure condition. An ANOVA test of the difference in navigation task completion times between the two conditions indicates

[11] As would be expected, all of these participants chose the competitor interface. Interestingly, the difference in the means between the two time pressure conditions seems to be driven by severe misstepping that subsequently leads those participants to choose the competitor. To test for differences between the time pressure conditions under free learning (although it would be in the opposite direction predicted by H_{13}), Fisher's Exact Chi Square test is carried out, and the results indicate that there is no difference in incumbent choice shares between the time pressure conditions under free learning (p-value = 0.5186). When *Bad Misses* are removed from the sample the Free Learning/Time Pressure condition has a choice share of 71%.

that the manipulation did work, as average task completion time under time pressure was 179.02 seconds, while the average task completion time without pressure was 217.27 seconds. This difference is significant at conventional levels ($F(1,80) = 5.073$, p-value = 0.027). In addition to the navigation times, we can also look at the time participants took to choose an interface. An ANOVA test of the difference in choice times between the two conditions provides further evidence that the manipulation did work. While there is no difference between learning conditions ($F(1,78) = 0.000$, p-value 0.990), and the interaction was not significant ($F(1,78) = 1.197$, p-value = 0.277), there is a difference in the choice times between the time pressure conditions ($F(1,78) = 5.050$, p-value = 0.027). In the no time pressure condition participants, on average, took 27.34 seconds to make a decision, while in the time pressure condition participants averaged a choice time of 21.2 seconds.

In Experiment 5, all participants were fully trained – i.e., had 9 trials – with the incumbent interface(s) before being exposed to the competitor. Therefore, we would not expect RTCT to be playing an important role here, as earlier studies indicated that the number of incumbent trials was the primary driver of differences in RTCT. The mean RTCTs in each condition are: No Time Pressure/Free Learning, -13; No Time Pressure/ Constrained Learning, -13; Time Pressure/Free Learning, -6; and, Time Pressure/Constrained Learning, -9. Although there are small differences in the mean RTCT between conditions, with time pressure generally resulting in faster transfer times, based on an ANOVA test these differences are not significant (Time Pressure, $F(1,78) = 0.000$, p-value = 0.999; Learning, $F(1,78) = 2.936$, p-value = 0.091; Time Pressure*Learning, $F(1,78) = 0.300$, p-value = 0.585).

Discussion

Experiment 5 demonstrated that, when skill-based habits of use develop, and human capital acquisition reaches an asymptote, consumers can come to prefer inferior alternatives – especially if they are free to learn and not under time pressure. The fact that free learning leads to a greater preference for the incumbent suggests a limit on the ability of first-mover firms to establish dominant market shares by constraining consumer choice. Nevertheless, even in the constrained learning condition approximately half of the participants in this study chose the inferior, but more practiced, incumbent interface.

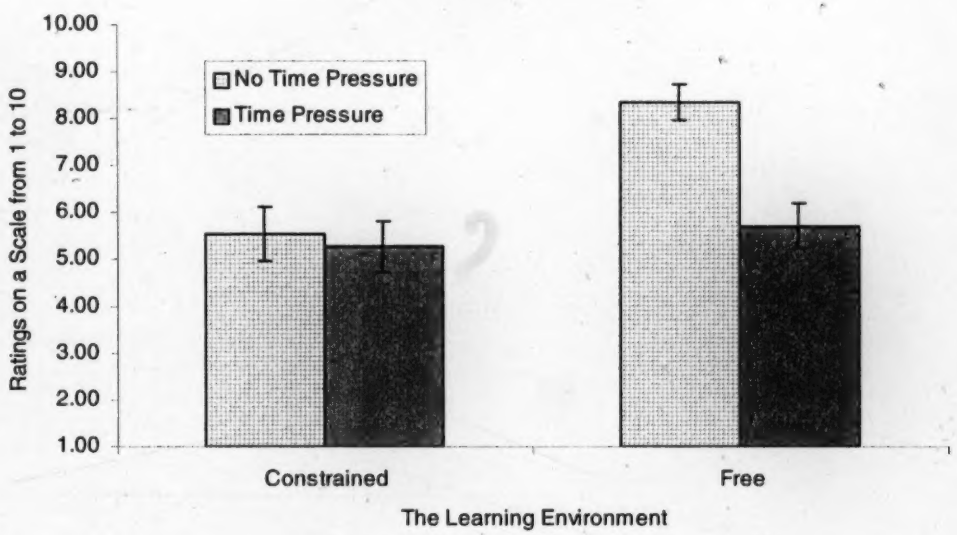
The finding that constraining consumers to a single product during their initial product trials leads to a lower market share for the incumbent as compared to free learning is not consistent with the predictions of the human capital models (e.g., Ratchford, 2001, Equation 8). The results of Experiment 5 indicate that participants are more likely to choose the incumbent in a competitive environment, even though free learning means that the learning is more generalized and less brand specific. Although the findings conflict with the predictions of the human capital model, they *are* consistent with the theory of psychological reactance (Brehm and Brehm 1981). According to reactance theory consumers who feel that they have had their freedom of choice restricted may react negatively towards the source of that restriction (Fitzsimmons 2000; Godek and Yates 2003). This reactance seems to be especially strong among those participants who make an excessive number of navigation errors during the initial incumbent trials, all of whom subsequently chose the competitor.

Fitzsimmons (2000) found that, in addition to affecting choice behavior, reactance can also affect consumers' perceptions of the consumption process. Specifically, his data

indicated that constraining consumers' choices led to lower ratings of their satisfaction with the consumption process, but had no effect on the consumers' satisfaction with the outcome of the process. If a similar type of reactance was present in Experiment 5, then we should see lower ratings of process satisfaction among constrained consumers (i.e., those under time pressure or in conditions of brand-specific learning); however, there should be no difference between experimental conditions on measures of outcome satisfaction.

Although Experiment 5 was not originally intended to test predictions regarding consumer satisfaction, surrogate measures of satisfaction were obtained as part of the survey conducted at the end of the experiment. In particular, participants rated the ease of use for each of the interfaces (a measure of process satisfaction), and they rated how much they liked the interface that they chose (a measure of outcome satisfaction). A post hoc examination of the data from Experiment 5 indicates that the condition means of these two measures are consistent with the findings of Fitzsimmons (2000). The ease of use ratings are depicted in Figure 13.

Figure 13
Experiment 5: Ratings of Ease of Use



Based on an ANOVA, the main effects for time pressure ($F = 9.473$, $p = 0.003$), learning environment ($F = 9.030$, $p = 0.004$), and the interaction of the two factors are significant ($F = 5.688$, $p = 0.020$). However, there are no significant differences between conditions based on ratings of how much the participants *liked* (a measure of outcome satisfaction) the interface that they chose (ANOVA: time pressure, $F = 1.278$, $p = 0.262$; learning environment, $F = 0.733$, $p = 0.395$; interaction, $F = 0.043$, $p = 0.837$). Therefore, the data are consistent with participants reacting against the constraints of time pressure and brand-specific learning in both the choices they make and their satisfaction with the process.

Although the finding that the level of competition appears to affect consumer loyalty may be somewhat surprising, analogous results have been reported from data collected outside of the laboratory. The consulting firm Burke Incorporated also

attributes similar findings, between different industries based on the level of competition within the industry, to psychological reactance (Lightfoot 2003). Specifically, they find that customer loyalty is 34% lower in industries with limited competition – such as utilities, cable TV, satellite TV, and cellular service – then it is in more competitive industries. The results of Experiment 5 suggest that psychological reactance is the mechanism underlying the rejection of the hypotheses based on economic models of human capital; and thereby establishes a potentially important limitation on the ability of brand-specific training to affect consumer choice.

The conclusions that can be drawn from this study with regards to the impact of time pressure on the development of consumer loyalty are limited. Because time pressure had no significant effect on consumer choice, it is unclear whether time pressure does not affect this type of lock-in or the manipulation of time pressure was simply not strong enough to produce an effect. However, it is apparent that time pressure does decrease perceived ease of use, and that under conditions of free learning time pressure can lead some consumers to severe product misuse (i.e., extreme misstepping). Moreover, given that the previous studies in this dissertation have demonstrated that decreasing ease of use (increasing usage errors) reduce the probability of choosing the incumbent, it would seem that, in contrast to the predictions of the human capital model, time pressure may depress the incumbent's market share.

General Discussion

The research described in this dissertation is intentionally broad in scope. The experiments were designed demonstrate the power of one important type of human capital (i.e., skill-based habits of use) to create loyal consumers. Nevertheless, it is clear

from the reported results that the primary factors in the development of this type of loyalty are the ability to transfer from the incumbent to the competitor and the ease with which the incumbent can be used. In addition, there is strong evidence that consumers' goals are key to the activation of habitual behaviour, and that the advantage the incumbent enjoys as the result of habitual consumption can be substantially reduced if the automated behaviour associated with the incumbent is not linked to the activated goal.

While the role of human capital as a determinant of consumer choice is clearly an important area of inquiry, it has been almost completely ignored in the marketing literature. This research is a first step toward a better understanding of how the acquisition of skill and knowledge over time affects consumer decision making. Table 8 details the experimental designs and the results of each of the five experiments, and summarizes the important contribution each experiment makes to our understanding of how practice affects preference. The first experiment demonstrates the basic effect – practice with an incumbent results in a preference for the incumbent – and, it uncovers two theoretically critical variables: usage errors (i.e., missteps) and skill transferability. The central role being played by product usage errors and skill transferability rules out a number of possible alternative explanations, and speaks directly to the process through which habitual use leads to an advantage for the incumbent.

The second and third experiments investigate the importance of goal activation in this type of loyalty. The results of Experiment 2 indicate that, when the consumer has no experience with alternative interfaces, the probability of using a competitor is driven by novelty seeking and a willingness to accept risk rather than by skill-acquisition. In addition, when interface choice was not determined by habitual use and the new goal was

Table 8: Overview of Experiments and Results

	Experiment One	Experiment Two	Experiment Three
Between Subjects Design	2 (path similarity) x 9 (incumbent trials)	2 (goal-activation) x 2 (incumbent trials)	2 (goal-activation) x 2 (incumbent trials)
Number of Incumbent Trials	From 1 to 9	1 vs. 9	1 vs. 9
Time pressure	No	No	No
Learning Environment	Constrained	Constrained	Constrained
Navigation Path Similarity	Same vs. Changing	Same	Same
Goal-activation	Same	Same vs. Different	Same vs.Different
Interface Complexity	High	High	High
Experience with competitor required	Yes	No	Yes
Objective Functionality of competitor	Equivalent	Equivalent	Equivalent
1 Trial Incumbent Choice Share*	48%	67%	65%
9 Trials Incumbent Choice Share*	67%	57%	80%
9 Trials Incumbent Choice Share**	NA	NA	NA
RTCT had an effect	Yes	NA	NA
Misstepping had an effect	Yes	No	Yes
Perceptions of risk had an effect	No	Yes	No
Practice makes preference	Yes	No	Yes

	Experiment Four	Experiment Five
Between Subjects Design	2 (complexity) x 2 (incumbent trials)	2 (time pressure) x 2 (learning environment)
Number of Incumbent Trials	1 vs. 9	9
Time pressure	No	No vs. Yes
Learning Environment	Constrained	Constrained and Free
Navigation Path Similarity	Same	Same
Goal-activation	Same	Same
Interface Complexity	High vs.Low	Low
Experience with competitor required	Yes	Yes
Objective Functionality of competitor	Equivalent	Superior
1 Trial Incumbent Choice Share*	45%	NA
9 Trials Incumbent Choice Share*	64%	NA
9 Trials Incumbent Choice Share**	73%	47%
RTCT had an effect	Yes	No
Misstepping had an effect	Yes	Yes
Perceptions of risk had an effect	No	No
Practice makes preference	Yes	NA

* comparing the cells that are similar across experiments – same goal condition and high interface complexity
** 9 trials, low interface complexity and no time pressure

not associated with either interface, goal-activation did not affect choice. This finding led to the design of the third experiment. Experiment 3 found strong evidence that goal activation can impact consumer choice. Again, it was apparent from this experiment that usage errors played an important role such that misstepping reduced the effect of practice and impeded the development of a preference for the incumbent.

The fourth experiment further examined the effect of usage errors on consumer choice, and thereby established an important limitation on the basic finding that skill-acquisition leads to lock-in. Specifically, the results clearly indicate that increasing the amount of required skill-acquisition means that an advantage for the incumbent is slower to develop. The fifth, and final experiment, investigated the impact of two moderating variables that had been proposed in the literature as potential facilitators of lock-in as a result of skill-acquisition: time pressure and a constrained learning environment. From a human capital perspective, the results of this experiment are surprising. Rather than increasing loyalty to the incumbent, constraining and pressuring consumers leads to a weaker preference for the incumbent. However, it is worth noting that, at worst, the incumbent (judged in pre-tests to be inferior on a number of dimensions as compared to the competitor, Interface C) ended up with a choice share equal to that of the competitor; further evidence of the powerful effect that habitual use can have on consumer choice.

Taken together, these five experiments provide compelling evidence that habits of use can lead to a type of consumer loyalty that is distinct from traditional conceptualizations of loyalty, yet likely to be extremely prevalent in the everyday lives of most consumers. The fundamental premise of this work, strongly supported by the empirical evidence presented, is that the skill-based habits of use have a powerful effect

on consumer choice. This effect is driven by the acquisition of skills, over repeated experiences,that do not easily transfer from the incumbent to the competitor.

Human Capital and The Principle of Least Effort

The results reported throughout this dissertation are very consistent with Zipf's (1949) *principle of least effort*. When a consumer acquires interface-specific skills, less effort is required to complete future consumption tasks using that interface. This leads to a greater market share for the incumbent interface as compared to competitors with which the consumer has not acquired an equivalent level of skill. On the specific dimension of the time it takes to complete the consumption task, I have used the *Relative Task Completion Time* (RTCT) metric as a measure of the relative effort required to use the incumbent as compared to the competitor. The evidence clearly indicates that RTCT plays an important mediating role between the number of product trials and the product's market share. Therefore, the data reported in this dissertation provide additional support for the contention of Jacob Nielsen (2000), and other usability pundits, who have argued that the most important ingredient in designing a successful website is the interface's ease of use.

However, only the human capital models (Becker 1993, 1996; Ratchford 2001; Stigler and Becker 1977; Wernerfelt 1985) speak directly to the issue at the center of the research reported in this dissertation: skill acquisition through practice affects product usability (i.e., the effort required to use the product), which in turn results in a preference for that product, even though with equal experience other products would be equally preferred. This effect goes beyond the obvious conclusion that people prefer to do what is easier and demonstrates that ease of use is subjective insofar as it is affected by the

experiences of the individual consumers; thereby establishing a causal link between practice and product preference. Although this link has been consistently predicted by the human capital models of consumer choice, the research reported in this dissertation is the first time that the important role played by skill-based habits of use has been empirically demonstrated. Moreover, although the *principle of least effort* can account for many of the results reported at a cursory or superficial level, it does not provide anywhere near the depth and breadth of the human capital models in terms of the specific predictions that link product choice to skill acquisition over time. Therefore, the human capital models, especially Ratchford's (2001) model of consumer loyalty, are ideally suited to provide the theoretical base and motivation for the design of experiments 1, 4 and 5. While the predictions of Ratchford's model are often contradicted by the reported results, it is worth noting that this dissertation examines a very specific type of human capital that is acquired rapidly and affects consumer choice as the result of only small differences in usability between two products. The predictions of the human capital model with regards to complexity, time pressure, and brand-specific training may still be relevant in situations that involve the acquisition of knowledge and skill over much longer periods of time and/or result in much greater differences in usability between competing products.

Managerial Implications

The managerial implications arising from this research centre around three strategic decisions: market research, product design, and market entry. From a market research perspective, the findings of the research presented in this dissertation reinforce the conclusions of Murray and Häubl (2003, p. 278) who argued that:

> Early in the market research and product development process an effort [should] be made to understand the accumulated human capital of the target user group(s). It is important to consider that, from a user perspective, the cost of a new piece of software or of a purchase at a new online store incorporates not only the price of the product, but also the time cost associated with learning to use the product or to complete the purchase transaction.

However, the importance of considering human capital in building and marketing new products extends beyond software. In fact, for any product with which consumers may accumulate human capital it is imperative that market research efforts consider the impact that previous use has on future decision making. For example, consumers appreciate the convenience and timesavings that are gained by learning to efficiently navigate the aisles of the local grocery, which should be taken into account if the store is renovated. Another example comes from Gillette's Mach3Turbo razor, which attributes much of its success and market acceptance to the fact that the razor was built to take advantage of the skill many men had already developed in shaving against the grain. At the extreme, Becker (1996) goes so far as to argue it is essential for public health officials to consider the human capital that has been accumulated by addicts (smokers, alcoholics, drug addicts, etc.) in creating products and programs designed to curb or eliminate the addiction.

My view on product design is similarly straightforward: any product that can facilitate the development of non-transferable skills has an advantage in customer retention, because brand-specific skill acquisition creates a significant cost of switching. It is worth noting that the effects demonstrated in this chapter arise from relatively subtle

differences between two interfaces. If simply exchanging radio buttons for pull-down menus can create a 33% difference in market share over only nine trials with a task that at its peak takes an average of 137 seconds to complete, the switching costs that can be built into more sophisticated real-world products have the potential to create a profound competitive advantage.

A commonly used example of such a design feature is Amazon's one-click technology. "One-click" expedites the purchasing process for Amazon's customers. In many online stores once a product has been selected for purchase the customer has to go through a lengthy process of entering credit card and shipping information. In contrast, when a shopper at Amazon.com finds an item that they wish to purchase they simply click on the "one-click" button and the checkout process is automated. Amazon has vigorously, and litigiously, defended this feature arguing that it is a patented technology of central importance to Amazon's customer relationships. Lands' End's *My Virtual Model*™ is another example of a website feature that aims to make shopping, in this case for clothes, easier. After an initial registration process, that takes less than 10 minutes to complete, *My Virtual Model*™ allows the shopper to "try clothes on" while browsing through the e-store. You can even email your model to a friend or family member, which allows them to see how the clothes would look on you before they make a purchase. Effectively using *My Virtual Model*™ to shop for clothes online requires the development of a set of non-transferable skills that should help Lands' End lock more customers into its online shopping experience.

Examples of innovative features that facilitate the development of user skills with the potential to lock customers in, are equally abundant outside of e-commerce. Japanese

car manufacturers were able to create a strong segment of loyal consumers, for an initially inferior product, by incorporating features such as cup holders into their automotive designs. Apple's iPod digital music player has received rave reviews about the "Touch Wheel interface" design. Other examples include Herman Miller's Aeron ergonomic chair (sales of which have boosted market share and profits since 1994), OXO good grip kitchen tools (famous for their soft and wide handles), LeapFrog's LeapPad learning-to-read system (that helps children sound out words), Taylor Made's "Bubble Shaft" for golf clubs (first to design different shafts for different clubs), TiVo's Season Pass™ (a feature on the digital TV recorder that ensures you never miss an episode of your favourite TV shows), and Gillette's Mach3Turbo triple blade razor (which allowed men a comfortable shave against the grain). Such innovative features offer substantial advantages to the product's users.

However, although some of these features are protected by patents (e.g., Gillette has 35 patents protecting its Mach3Turbo), all appear to be vulnerable to competitors employing copycat strategies. Specifically, a second-mover can design its own products to maximize the degree to which skills gained using the first-mover can be transferred to the follower. For example, Barnes and Noble's internet store developed its own version of Amazon's "one-click" technology, which allowed customers to automate the checkout procedure on bn.com in much the same way that they could at Amazon.com. Barnes and Noble's top-screen navigation features are also very similar to Amazon's well-known "tab-based" navigation. Similarly, Schick has come out with its own Extreme 3 System (3-blade razor) to compete with Gillette's Mach3Turbo, as well as one-upping Gillette with the Quattro (4-blade razor). While a copy-cat strategy alone may not be enough to

overcome the first-mover advantage (Carpenter and Nakamoto 1989) that Amazon.com and the Mach3Turbo have acquired, recent research has demonstrated that the copy-cat approach can make the second-mover much more appealing than any other competitors and it can do so without causing any negative customer reactions – e.g., the second-mover being perceived as a poor imitation (Warlop and Alba in press). Extrapolating from the current research, part of the appeal of a copycat may be that consumers willing to consider switching away from the first-mover are likely to prefer alternatives to which most of their human capital can be transferred.

A Competitive Dilemma

Clearly, there is value in developing a product or service that facilitates the acquisition of brand-specific non-transferable skills within an installed customer base. Such differentiation has long been a hallmark of successful marketing (Levitt 1980). However, the more functionally different a product is from its competitors, the harder it is to attract new customers, because they have acquired fewer of the skills necessary to easily use the product. A product with a customer base locked-in as a result of their accumulated brand-specific human capital is in a good position to defend its market share, but is likely to struggle to attract customers away from competing brands. Take, for example, Apple computers. For years, Apple has enjoyed a fervently loyal customer base, in part due to their unique design features, but struggles to switch new customers over from their PC competitors. While a dominant market share built on a locked-in customer base may be able to attract new customers as it benefits from the network effects inherent in being the standard (e.g., Microsoft Windows), a first-mover without a dominant market share is likely to struggle to both protect its market share and

simultaneously attract new customers. As a result, firms face a competitive dilemma: they must decide whether to focus on retaining current customers or attracting new customer. Ideally, most organizations would like to find a way do both. Clearly a better understanding of how to manage this dilemma is an area that deserves further research.

Implications for Consumer Welfare

The power of habitual use lies in the ability to reduce the cost of consumption. There is tremendous value in the ability to automate many of our routine behaviours, from finding milk at the grocery store to typing a letter, to looking up the latest news headlines on the internet. As the product (store, web site, etc.) becomes easier to use, the consumer becomes increasingly locked-in, and it is more difficult to switch to a competing product. Habits are notoriously hard to break primarily because the more automated behaviour becomes the less accessible it is to conscious control (Ouelette and Wood 1998). This creates a dilemma for consumers. Repeatedly using a specific brand (e.g., shopping at a particular store) increases its value because of the human capital acquired. On the other hand, the more brand-specific the acquired human capital is, the more difficult it is to switch brands. Using a number of brands in an attempt to acquire generalized skill and knowledge may reduce or eliminate lock-in to any one brand; however, such a strategy also reduces or eliminates the value gained from brand-specific training (i.e., increased efficiency). The results of Experiment 5 indicate that even when consumers have a choice among brands initially, most will quickly settle into using only one, and the majority will become locked-in, even when a new superior alternative is made available. Zauberman's (2003) findings are relevant here as he argued that

consumers will gravitate towards what is easier in the short-term, even at the expense of long-term value.

Dissatisfaction: Loyalty's Achilles' Heel?

As powerful as habitual use is in creating loyalty, the results of the experiments discussed in this dissertation demonstrate that errors in product usage can have a powerful anti-lock-in effect. Specifically, when the product is misused or difficult to use, habit formation is impeded and the probability of switching to a competing product rises dramatically. As previously stated, such errors are a potential source of product *dis*satisfaction because they reduce the usability of the product and, therefore, reduce the ability of the product to satisfy the needs of the consumer. Oliver (1999) has claimed that such dissatisfaction is the Achilles' Heel of strong forms of loyalty. He argues that, although satisfaction is not a direct determinant of loyalty[12], dissatisfaction is a compelling incentive to switch.

The results of Experiments 1, 3 and 4 provide evidence in support of Oliver's claim. Experiments 1 and 3 demonstrated that errors in product use decreased the perceived ease of using the product and suppressed the impact that practice had on increasing consumer loyalty. Experiment 4 established the important mediating role that usage errors play between the objective ease of using the product and consumer choice. Experiment 5 illustrated the impact that decreasing perceptions of ease of use, via constraints within the learning environment, have on suppressing the incumbent's choice share. Overall, it is clear that subjective product usability, a surrogate for consumer

[12] Reichheld (1996) provides persuasive evidence on this point: data from Bain and Company indicate that 65% to 85% of customers who indicate that they are satisfied or very satisfied will switch.

satisfaction, is an important variable in the development of habits of use and loyal behaviour. Counter-intuitively, dissatisfaction seems to be a positive force for consumer welfare, as it encourages switching even when an otherwise prohibitive switching cost must be paid. Although more research is warranted, dissatisfaction may be one of the key reasons why, even in markets with first-movers that effectively facilitate the development of non-transferable skills, "loyalty behavior is in an apparent state of equilibrium" (Oliver 1999, p. 43).

Future Research

This dissertation points to a number of exciting areas for future research and exploration. For example, there is a need for work that better addresses why consumers react against the incumbent when they learn to use it under constrained conditions. In addition, throughout the experiments reported here, participants were given utilitarian tasks because such tasks are amenable to habitual use. However, it would be interesting to see if the results of this research would generalize to hedonic tasks. For example, does surfing a news web site for hedonic reasons lead to different learning curves and different probabilities of switching?

Another constant in this research was the stability of the interface itself. Regardless of the preferences and performance of the user, the interface remained the same from trial to trial and from user to user. The focus has been on what the consumer learns and how that affects choice. However, given the current state of technology and web site design, it is quite possible that, while the consumer is learning about the interface, the interface also learns about the consumer. Research currently underway (Murray, Häubl and Johnson 2004) aims to better understand how an interface that

personalizes itself to the needs of the user may affect the type of lock-in examined in this dissertation.

Similarly, to meet the needs of a changing customer base, it may not always be possible to maintain a highly consistent consumer experience, which theories of habit formation suggest is necessary for the development of habits of use (Ouellette and Wood 1998). The results of Experiment 1 demonstrate that the phenomenon is robust to small or moderate changes from trial to trial; however, there is more work to be done if we are to understand how easily consumers can form habits of use in less stable environments. In the same way, this research touches on the issue of product evolution versus revolution. What is the impact of launching a dramatically redesigned product on an installed user base? What strategies can best alleviate any resulting disruption in habitual product use? From a customer retention perspective, is product evolution better than product revolution?

In general, the role of habit in consumer choice appears to be a very interesting and fruitful area of research for years to come. This dissertation has examined only one type of habit – skill-based habits of use. There are many other types of habit on the continuum from reflexive consumer behaviour to complex knowledge structures of goal-activated behaviours. How the different types of habits form, how they are maintained, and how they can be broken are all areas of interest to marketing practitioners as well as academics in marketing and related fields.

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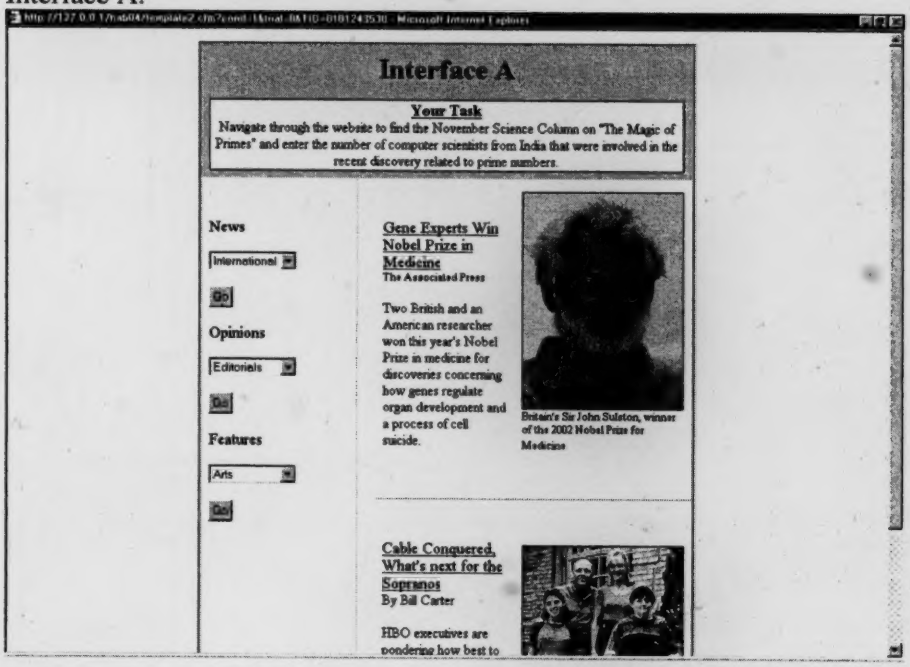
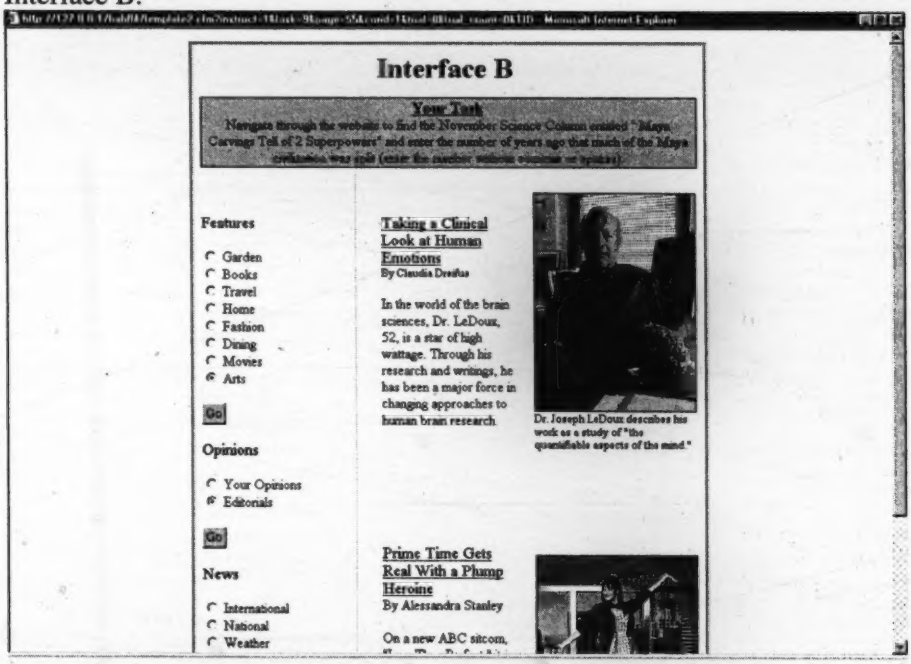
APPENDIX A

Screen Shots

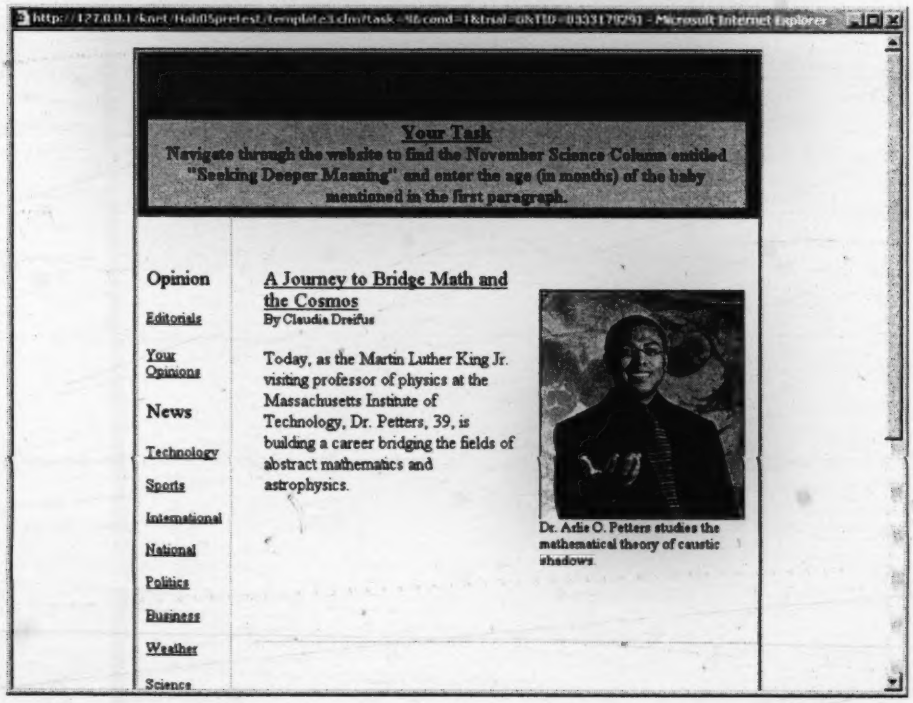
Interface A:


Interface A
Your Task
Navigate through the website to find the November Science Column on "The Magic of Primes" and enter the number of computer scientists from India that were involved in the recent discovery related to prime numbers.
News
International
Go
Opinions
Editorials
Go
Features
Arts
Go
Gene Experts Win Nobel Prize in Medicine
The Associated Press
Two British and an American researcher won this year's Nobel Prize in medicine for discoveries concerning how genes regulate organ development and a process of cell suicide.
Britain's Sir John Sulston, winner of the 2002 Nobel Prize for Medicine
Cable Conquered, What's next for the Sopranos
By Bill Carter
HBO executives are

Interface B:



Interface C:


Your Task
Navigate through the website to find the November Science Column entided "Seeking Deeper Meaning" and enter the age (in months) of the baby mentioned in the first paragraph.
Opinion
Editorials
Your Opinions
News
Technology
Sports
International
National
Politics
Business
Weather
Science
A Journey to Bridge Math and the Cosmos
By Claudia Dreifus
Today, as the Martin Luther King Jr. visiting professor of physics at the Massachusetts Institute of Technology, Dr. Petters, 39, is building a career bridging the fields of abstract mathematics and astrophysics.
Dr. Arlie O. Petters studies the mathematical theory of caustic shadows.

APPENDIX B

Post Experiment 4 Questionnaire

1. I liked using the interface that I chose to use for the last trial.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

2. I trusted the interface that I chose to use for the last trial.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

3. I felt there was less risk in using the interface that I chose to use for the last trial.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

4. I found the site I chose easy to navigate.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

5. I found Interface A easy to use.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

6. I found Interface B easy to use.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

7. I would recommend Interface A to others.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

8. I would recommend Interface B to others.
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

9. I found the first interface easier to use after the first couple of trials [this question asked only of those who have more than 2 trials]
   Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

10. I gained skill at using Interface A.
    Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

11. The more practice I had with an interface the better I was at completing the task.
    Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

12. If you had no experience with either interface, which would you choose?
    Interface A Interface B

13. During the study, why did you choose the interface that you chose?

14. How much experience do you have with the internet [in years]?
No experience 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 A great deal of experience

15. How old are you?

16. What is your gender?

Post Experiment 5 Questionnaire

1. Why did you choose the interface that you chose for the last trial?

2. I liked the interface that I chose to use for the last trial.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

3. I trusted the interface that I chose to use for the last trial.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

4. I felt there was less risk in using the interface that I chose to use for the last trial.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

5. I found the interface I chose easy to navigate.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

6. If you had no experience with either interface, which would you choose?
Interface A Interface B

7. The more practice I had with the Interface the better I was a completing the task.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 Strongly Agree

8. I found Interface A easy to use.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

9. I found Interface B easy to use.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

10. I found Interface C easy to use.
Strongly Disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Strongly Agree

11. How much experience do you have with the internet?
No experience 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 A great deal of experience

12. How old are you?

13. What is your gender?

APPENDIX C

Experiment 1 – Task Completion Time Summary Data (in seconds)

Trials	Means	Std Errors	Last Trial	Competitor Trial
1	69.6	14.960	135.89	66.26
2	-0.6	5.978	37.67	38.26
3	-17.4	5.202	33.07	50.51
4	-14.6	4.802	32.16	46.77
5	-10.7	3.762	32.89	43.59
6	-15.3	2.999	22.07	37.40
7	-19.0	3.294	18.44	37.41
8	-16.5	2.432	17.81	34.35
9	-16.8	2.855	17.11	33.92

Experiment 4 – Task Completion Time Summary Data (in seconds)

	RTCT Scores		*Std Errors*		*Last Incumbent Trial*		*Competitor Trial*	
	1 Task	**9 Tasks**	**1 Task**	**9 Tasks**	**1 Task**	**9 Tasks**	**1 Task**	**9 Tasks**
Low	39.227	-19.727	13.069	2.383	83.273	10.182	44.045	29.909
High	49.136	-26.818	14.424	3.222	118.864	21.227	69.727	48.045

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Education

Ph.D., Business & Psychology, May 2004
School of Business and Department of Psychology, University of Alberta

B.Sc., Psychology, April 1994
Faculty of Science, Department of Psychology, University of Alberta

Work Experience

Assistant Professor of Marketing, starting July 2004
Richard Ivey School of Business, University of Western Ontario

Investment Advisor, June 1994 to August 1999
Private Client Wealth Management, Edmonton, AB

Journal Articles

Häubl, Gerald and Kyle B. Murray (2003). Preference Construction and Persistence in Digital Marketplaces: The Role of Electronic Recommendation Agents, *Journal of Consumer Psychology*, 13(1), 75-91.

Murray, Kyle B. and Gerald Häubl (2003). Skill Acquisition and Interface Loyalty: A Human Capital Perspective, *Communications of the Association for Computing Machinery*, 46(12), 272-278.

Book Chapters

Murray, Kyle B. and Gerald Häubl (in press), "Processes of Preference Construction in Agent-Assisted Online Shopping," in: *Online Consumer Psychology: Understanding and Influencing Behavior in the Virtual World*, Curt Haugtvedt, Karen Machleit and Richard Yalch, eds., Mahwah, NJ: Erlbaum.

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Conference Proceedings

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Non-Refereed Publications

Murray, Kyle B. (2003). Pricing Outside the Box. *National Post, Business Edge, Advanced Reading,* May 20th 2003.

Murray, Kyle B. (2003). A Match Made in Cyberspace. *National Post, Business Edge, Advanced Reading,* June 23rd 2003.

Murray, Kyle B. (2003). Why Online Buyers Don't Shop Around. *National Post, Business Edge, Advanced Reading,* May 20th 2003.

Selected Research in Progress

Murray, Kyle B. and Norman R. Brown. The Cognitive Representation of Reference Price [manuscript available]

Häubl, Gerald and Kyle B. Murray. The Double Agent: Potential Benefits and Pitfalls of an Electronic Agent's Recommendations [manuscript available]

Murray, Kyle B. and Gerald Häubl. The Role of Skill-Based Habits of Use in Consumer Choice.

Murray, Kyle B. and Gerald Häubl. Learning to be Loyal: Convenience, Competition and Customer Retention.

Murray, Kyle B., Adam Finn, and Peter Popkowski Leszczyc. The Effect of Weather on Consumer Spending.

Murray, Kyle B., Gerald Häubl, and Eric Johnson. Lock-In through Personalization: The Negative Transfer Effect.

Murray, Kyle B. and John Godek (2003). Personalization and Customization: Consumers' Preferences for Product Choice Modes.

Conference Presentations

Learning to be Loyal: Convenience, Competition and Customer Retention. Presented at the University of Alberta's Distinguished Scholars Retreat, May 7th and 8th, 2004.

The Double Agent: The Benefits and Pitfalls of an Electronic Agent's Recommendations. Presented at the Society for Consumer Psychology's 2003 Conference, in New Orleans, Louisiana. Part of the special session entitled "Preference Structures, Formation, and Sources of Influence on Consumer Behavior: Insights from Online Environments."

The Structure of Consumer Knowledge for Automobile Prices: Estimating and Updating. Presented at the Association for Consumer Research's 2002 Conference, in Atlanta, Georgia. Part of the special session entitled "Consumer Knowledge about Prices and Profits: The Potential for Deception in Cause Related Marketing Campaigns."

Towards an Understanding of Internal Reference Price Estimation. Presented at the 16th Annual Joseph R. Royce Research Conference, in Edmonton, AB., Friday, April 5th, 2002. (winner of the W. R. Runquist Research Award for the best graduate student paper)

Estimating and Updating Internal Reference Prices: An Examination of Automobile Prices. Presented at Fordham University's Pricing Conference 2001, in New York, New York. November 2-3, 2001; also presented at University of Alberta's Business Research Conference 2002, in Edmonton, AB. February 15, 2002

The Fiction of No Friction: An Experimental Investigation of Cognitive Lock-In as a Result of Brand Specific Training in an

Online Shopping Environment. Presented at the 2001 Marketing Science Conference, July 5, in Wiesbaden, Germany.

Recommendation Agents and the Mere Inclusion Effect. Presented as a competitive paper at the Society for Consumer Psychology's 2001 Conference, February 15-17, in Scottsdale, AR.

The Fiction of No Friction: Switching Costs and Consumer Loyalty Online. Presented at the Association for Consumer Research's 2001 Conference, in Austin, Texas. Part of a special session entitled "Loyalty by Design: Understanding Consumers' Reluctance to Shop when Buying Online"

Preference Construction and Persistence in Artificial Marketplaces: The Role of Recommendation Agents. Presented as part of the special session on "Consumer Behavior in Artificial Marketplaces", at the Association for Consumer Research's 2000 Conference in Salt Lake City, October 19th to 22nd, 2000; and, at the INFORMS Conference "Marketing Science and the Internet: Understanding Consumer Behavior on the Internet", held at the University of Southern California's Marshall School of Business, April 27th to 30th, 2000

Grants

Co-recipient of a Teradata Center for Customer Relationship Management

Research Seed Grant, based on my dissertation research. Duke University, Fuqua School of Business. (with Gerald Häubl)

Contributing Researcher, *Initiative on the New Economy* Research Alliances Program Web Interaction Cycle Grant, Social Sciences and Humanities Research Council of Canada (538-2002-1013)

Awards

Andrew Stewart Memorial Research Award, 2003/04

University of Alberta Dissertation Fellowship, 2003/04

Social Sciences and Humanities Research Council of Canada Doctoral Fellowship, 2002/03

Walter H Johns Graduate Fellowship, Research Award, 2002/2003

Province of Alberta Graduate Fellowship, 2001/02

AMA-Sheth Doctoral Consortium Fellow, University of Miami, 2001

School of Business, PhD Fellowship & Endowment Fellowship, 99/03

Dean's List, Faculty of Science, University of Alberta, 1993/1994

Teaching Awards

University of Alberta Graduate Student Teaching Award, 2003

Nominated MBA Professor of the Year, University of Alberta, 2002

Teaching Experience

Instructor, Using and Managing Communications Networks
University of Alberta, Faculty of Extension, Spring 2004

Instructor, Using and Managing Communications Networks
University of Alberta, Faculty of Extension, Spring 2003.
Student's Instructor Evaluation, Average Rating of 4.9 out of 5

Instructor, Introduction to Electronic Commerce (distance learning, over the internet) University of Alberta, Faculty of Extension, Summer 2002 Student's Instructor Evaluation, Average Rating of 4.7 out of 5

Instructor, MBA Electronic Marketing
University of Alberta, School of Business, Winter 2002
Student's Instructor Evaluation, Average Rating of 4.6 out of 5

Instructor, Undergraduate Electronic Marketing
University of Alberta, School of Business, Winter 2002
Student's Instructor Evaluation, Average Rating of 4.2 out of 5

Teaching Assistant, MBA and Undergraduate Electronic Marketing
University of Alberta, School of Business, 2001

Course Development

Developed the distance-learning (internet based) course, Introduction to E-Commerce, for the Faculty of Extension's Masters Program in Communications and Technology (MACT), University of Alberta, 2002

Co-developed the Advanced Electronic Marketing courses, Graduate (MBA) and Undergraduate (B.Comm), University of Alberta, 2001 (with Gerald Häubl)

Academic Service

Senior Research Associate, Institute for Online Consumer Studies

Graduate Student Representative on the Marketing Department's Chair Selection Committee 2004

PhD Student Representative on the Business Council 2001-2003

Student Representative on the Faculty of Graduate Studies and Research Council 2001-2003

Organization Membership

Association for Consumer Research

Society for Consumer Psychology

Society for Judgment and Decision Making

Association for Computing Machinery, SIGCHI

Additional Information

Additional information, including abstracts, full papers, a complete listing of conference presentations and invited talks, is available at http://www.kylemurray.com.